

National College of Ireland

Computing Project Final Report *Made for Leavers* 5 August 2024

Daniel Syrén, 20105070, x20105070@student.ncirl.ie

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Executive Summary

The project is called *Made for Leavers* as it is made for prospective students, mostly school leavers, who are looking to leave their country or city to study. Thus, the one primary objective of this project is to provide a website that helps prospective students find their right university in their right country or city. This one primary objective is achieved by the successful implementation of this project's two secondary objectives. Firstly, Made for Leavers is a centralised universities hub that takes a user's input of a country or city and outputs all the universities in that country or city as clickable links to their websites, which can be saved, loaded, and removed from a database. Secondly, Made for Leavers has a Ninja Al system embedded into Made for Leavers that acts as a quasi-guidance counsellor to prospective students. Prospective students around the world experience barriers when embarking on the journey of finding the right university for them. These barriers range from prospective students experiencing zero-motivation to anxiety. For prospective students looking to study in a different country or city, these barriers are heightened. Based on this, Made for Leavers provides a website that enables prospective students to get all the information they need with regards to leaving and studying in another country or city. Made for Leavers uses an Angular front-end, C# back-end, and SQL Server database. Azure is used to host the website and Firebase is used for login authentication and authorisation. In terms of API/AI, the Hipo/university-domains-list-api is used to retrieve all the universities in a particular country or city and the Ninja AI is used to facilitate a Ninja AI guidance counsellor. Made for Leavers has 8 functional requirements and 8 non-functional requirements. The priority for functional requirements ranges from the highest priority of 1 to the lowest priority of 8. The timeframe for non-functional requirements ranges from less than 1 second to less than 5 seconds. Made for Leavers consists of one SQL Server database called Made_for_Leavers. This database consists of one table called Universities. This table consists of four columns called id, email, name, and webPage. The Angular front-end consists of a Register component, Login component, Search component, Ask component, and Load component. Black box and white box testing are implemented on Made for Leavers. Made for Leavers passed 100% of its black box tests that consist of monkey/gorilla tests for functional requirements, Network Monitor for non-functional requirements, Postman for API tests, and Swagger for HTTP services tests. *Made for Leavers* passed 100% of its white box tests that consist of Jasmin/Karma for unit tests. Smoke tests are conducted regularly in addition to regression tests.

1.0 Introduction

1.1. Aims

The project is called *Made for Leavers* as it is made for prospective students, mostly school leavers, who are looking to leave their country or city to study. Thus, the one primary objective of this project is to provide a website that helps prospective students find their right university in their right country or city. This one primary objective is achieved by the successful implementation of this project's two secondary objectives. Firstly, *Made for Leavers* is a centralised universities hub that takes a user's input of a country or city and outputs all the universities in that country or city as clickable links to their websites, which can be saved, loaded, and removed from a database. Secondly, *Made for Leavers* has a Ninja AI system embedded into *Made for Leavers* that acts as a quasi-guidance counsellor to prospective students. The API/AI of the Hipo Labs API and the Ninja AI help prospective students find their right university in their right country or city.

1.2. Background

Prospective students around the world experience barriers when embarking on the journey of finding the right university for them. These barriers range from prospective students experiencing zero-motivation to anxiety. For prospective students looking to study in a different country or city, these barriers are heightened. Based on this, *Made for Leavers* provides a website that enables prospective students to get all the information they need with regards to leaving and studying in another country or city. Once again, the one primary objective of *Made for Leavers* is to provide a website that helps prospective students find their right university in their right country or city. Once again, this one primary objective is achieved by the successful implementation of this project's two secondary objectives. These secondary objectives can be summarised by *Made for Leavers* consisting of a centralised universities hub and a Ninja Al guidance counsellor. There is a demand for such a website and there is currently no supply of such a website.

1.3. Technology

Made for Leavers uses an Angular front-end, C# back-end, and SQL Server database. Azure is used to host the website and Firebase is used for login authentication and authorisation. In terms of API/AI, the Hipo/university-domains-list-api is used to retrieve all the universities in a particular country or city and the Ninja AI is used to facilitate a Ninja AI guidance counsellor. The project follows a Test-Driven Development approach. In other words, software requirements are turned into test cases before being turned into code. These software requirements are directly derived from the primary and secondary objectives of *Made for Leavers*. These requirements are broken into project tasks following a quasi-scrum model where, despite it being an individual project, a scrum system is implemented. Project tasks, activities, and milestones are broken-down into sprints.

1.4. Structure

The first section of this report is the introduction section and includes the subsections of aims, background, technology, and structure. The second section of this report is the system section and includes the subsections of requirements, functional requirements, non-functional requirements, use case diagram, descriptions and priorities, use cases, data requirements, user requirements, environmental requirements, usability requirements, design and architecture, implementation, graphical user interface, testing, and evaluation. The third section of this report is the conclusions section. The fourth section of this report is the further development or research section. The fifth section of this report is the references section. The sixth section of this report is the appendices section and includes the subsections of project proposal, ethics approval application, reflective journals, invention disclosure form, and other materials used.

2.0 System

2.1. Requirements

Made for Leavers has 8 functional requirements and 8 non-functional requirements. The priority for functional requirements ranges from the highest priority of 1 to the lowest priority of 8. The timeframe for non-functional requirements ranges from less than 1 second to less than 5 seconds.

2.1.1. Functional Requirements

ID	Description	Priority
FR1	Made for Leavers signs-up User via email and password	6
FR2	Made for Leavers signs-in User that entered correct email and password	7
FR3	Made for Leavers displays all universities in inputted country or city	1
FR4	Made for Leavers posts university into database	2
FR5	Made for Leavers provides answers via Ninja AI guidance counsellor	3
FR6	Made for Leavers gets universities from database	4
FR7	Made for Leavers deletes university from database	5
FR8	Made for Leavers logs-out User from Made for Leavers	8

2.1.1.1. Non-Functional Requirements

ID	Description	Timeframe
NFR1	Made for Leavers signs-up User via email and password	< 2 seconds
NFR2	Made for Leavers signs-in User that entered correct email and password	< 1 second
NFR3	Made for Leavers displays all universities in inputted country or city	< 1 second
NFR4	Made for Leavers posts university into database	< 2 seconds
NFR5	Made for Leavers provides answers via Ninja AI guidance counsellor	< 5 seconds
NFR6	Made for Leavers gets universities from database	< 2 seconds
NFR7	Made for Leavers deletes university from database	< 2 seconds
NFR8	Made for Leavers logs-out User from Made for Leavers	< 1 second



2.1.1.2. Use Case Diagram

2.1.1.3. Descriptions & Priorities

Made for Leavers has 8 functional requirements. Firstly, when a user loads Made for Leavers' Register page, inputs their email and password, and clicks the check icon, the user is registered on Made for Leavers. This first functional requirement is present to allow a user to register on *Made for Leavers* and is priority 6. Secondly, when a user loads *Made for Leavers'* Login page, inputs their email and password, and clicks the check icon, the user is logged into *Made for Leavers*. This second functional requirement is present to help a user secure their saved universities behind a login and is priority 7. Thirdly, when a user loads Made for Leavers' Search page, inputs a country or city by typing a country or city and clicking the search icon or clicking a recommended country, all the universities in the inputted country or city are outputted as clickable links to their websites. This third functional requirement is present to allow a user to search universities and is priority 1. Fourthly, when a user selects a searched university and clicks the save icon, that university is saved to the database. This fourth functional requirement is present to allow a user to store universities in a database and is priority 2. Fifthly, when a user loads Made for Leavers' Ask page, inputs a question on the Ninja Al guidance counsellor, and clicks the send icon, the Ninja Al guidance counsellor answers their question. This fifth functional requirement is present to allow a user to gain more information through a FAQs-esque system and is priority 3. Sixthly, when a user loads Made for Leavers' Load page, all the stored universities are outputted. This sixth functional requirement is present to allow a user to retrieve all the universities that they have saved from a database and is priority 4. Seventhly, when a user selects a loaded university and clicks the delete icon, that university is deleted from a database. This seventh functional requirement is present to allow a user to remove unneeded universities from a database and is priority 5. Eighthly, when a user loads *Made for Leavers* and clicks the logout icon, the user is logged out of Made for Leavers. This eighth functional requirement is present to allow a user to exit Made for Leavers and is priority 8.

212121	000 00000			
Use Case ID: UC1				
Use Case Name:	User registers email and pa	User registers email and password		
Created By:	Daniel Syrén	Updated By:	Daniel Syrén	
Date Created:	19/2/2024	Date Updated:	23/7/2024	
Description:	User registers email and pass	word		
Actors:	Primary) User			
	Secondary) Made for Leavers			
Triggers:	User enters appropriate emai	I and password		
Pre-conditions:	User has previously not signe	d-up for Made for Le	avers	
Post-conditions:	Made for Leavers displays Search page until User changes pages			
Normal Flow:	1) User enters appropriate email and password			
	2) Made for Leavers signs-up User via email and password			
Exceptions:	1) User enters inappropriate email and password			
	2) Made for Leavers displays error message if credentials are			
	inappropriate			
Includes:	Made for Leavers signs-up User via email and password			
Extends:	Made for Leavers displays error message if credentials are			
	inappropriate			
Priority:	6			

2.1.1.4.	Use Cases
	000 00000

Use Case ID:	UC2	UC2		
Use Case Name:	User logs-in with email an	User logs-in with email and password		
Created By:	Daniel Syrén	Updated By:	Daniel Syrén	
Date Created:	19/2/2024	Date Updated:	23/7/2024	
Description:	User logs-in with email and p	assword		
Actors:	Primary) User			
	Secondary) Made for Leavers			
Triggers:	User enters correct email and	d password		
Pre-conditions:	User has previously signed-u	Jser has previously signed-up for Made for Leavers		
Post-conditions:	Made for Leavers displays Search page until User changes pages			
Normal Flow:	1) User enters correct email and password			
	2) Made for Leavers sign	2) Made for Leavers signs-in User that entered correct email and		
	password			
Exceptions:	1) User enters incorrect email and password			
	2) Made for Leavers displays error message if credentials are			
	incorrect			
Includes:	Made for Leavers signs-in User that entered correct email and			
	password			
Extends:	Made for Leavers displays error message if credentials are incorrect			
Priority:	7			

Use Case ID:	UCS	UC3			
Use Case Name:	Use	User searches country or city			
Created By:	Dar	niel Syrén	Updated By:	Daniel Syrén	
Date Created:	19/	2/2024	Date Updated:	23/7/2024	
Description:	User s	earches country or city			
Actors:	Prima	ry) User			
	Secon	dary) Hipo Labs API			
Triggers:	User t	ypes country or city or	clicks recommended	country	
Pre-conditions:	User h	Jser has previously logged-in			
Post-conditions:	Made for Leavers displays all universities in country or city until User				
	chang	changes pages			
Normal Flow:	1)	User types country or	city or clicks recomm	nended country	
	2)	2) Made for Leavers displays all universities in inputted country			
		or city			
Exceptions:	1)	1) User types non-country or non-city			
	2)	2) Made for Leavers displays error message if university is not			
		found			
Includes:	Made	Made for Leavers displays all universities in inputted country or city			
Extends:	Made	Made for Leavers displays error message if university is not found			
Priority:	1				

Use Case ID:	UC4			
Use Case Name:	User saves searched unive	User saves searched university		
Created By:	Daniel Syrén	Updated By:	Daniel Syrén	
Date Created:	19/2/2024	Date Updated:	23/7/2024	
Description:	User saves searched universit	Σ γ		
Actors:	Primary) User			
	Secondary) Made for Leavers	econdary) <i>Made for Leavers</i>		
Triggers:	User selects searched univers	ser selects searched university for saving		
Pre-conditions:	User previously searched cou	ser previously searched country or city		
Post-conditions:	Made for Leavers' displays sa	<i>lade for Leavers</i> ' displays saved successful message until User closes		
	it			
Normal Flow:	1) User selects searched university for saving			
2) <i>Made for Leavers</i> posts university into database		tabase		
Includes:	Made for Leavers posts unive	lade for Leavers posts university into database		
Priority:	2			

Use Case ID:	UC5	UC5		
Use Case Name:	User asks question to Ninja	User asks question to Ninja AI guidance counsellor		
Created By:	Daniel Syrén	Updated By:	Daniel Syrén	
Date Created:	19/2/2024	Date Updated:	23/7/2024	
Description:	User asks question to Ninja A	I guidance counsello	r	
Actors:	Primary) User			
	Secondary) Ninja Al	econdary) Ninja Al		
Triggers:	Jser enters question on Ninja AI guidance counsellor			
Pre-conditions:	User has previously logged-in	ser has previously logged-in		
Post-conditions:	Made for Leavers' displays re	<i>Aade for Leavers</i> ' displays response until User changes pages		
Normal Flow:	1) User enters question on Ninja AI guidance counsellor			
	2) Made for Leavers prov	2) Made for Leavers provides answers via Ninja AI guidance		
	counsellor	counsellor		
Includes:	Made for Leavers provides ar	<i>Aade for Leavers</i> provides answers via Ninja AI guidance counsellor		
Priority:	3			

Use Case ID:	UC6			
Use Case Name:	User loads saved universit	User loads saved universities		
Created By:	Daniel Syrén	Updated By:	Daniel Syrén	
Date Created:	19/2/2024	Date Updated:	23/7/2024	
Description:	User loads saved universities			
Actors:	Primary) User			
	Secondary) Made for Leavers	econdary) <i>Made for Leavers</i>		
Triggers:	gers: User loads the appropriate <i>Made for Leavers</i> page		5	
Pre-conditions:	Iser previously saved universities to database			
Post-conditions:	Made for Leavers displays loaded universities until User changes			
	oages			
Normal Flow:	1) User loads the appropriate <i>Made for Leavers</i> page			
	2) Made for Leavers gets universities from database			
Includes: Made for Leavers gets universities from database				
Priority: 4				

Use Case ID:	UC7			
Use Case Name:	User removes loaded univ	User removes loaded university		
Created By:	Daniel Syrén	Updated By:	Daniel Syrén	
Date Created:	19/2/2024	Date Updated:	23/7/2024	
Description:	User removes loaded univers	sity		
Actors:	Primary) User			
	Secondary) Made for Leavers	econdary) Made for Leavers		
Triggers:	User selects loaded universit	ser selects loaded university for removing		
Pre-conditions:	lser previously loaded universities from database			
Post-conditions:	Aade for Leavers displays remaining loaded universities until User			
	hanges pages			
Normal Flow:	1) User selects loaded university for removing			
	2) Made for Leavers del	2) Made for Leavers deletes university from database		
Includes:	Made for Leavers deletes uni	Made for Leavers deletes university from database		
Priority:				

Use Case ID:	UC8			
Use Case Name:	User logs-out	User logs-out		
Created By:	Daniel Syrén	Updated By:	Daniel Syrén	
Date Created:	19/2/2024	Date Updated:	23/7/2024	
Description:	User logs-out			
Actors:	Primary) User	rimary) User		
	Secondary) Made for Leavers	econdary) Made for Leavers		
Triggers:	User clicks logout icon	ser clicks logout icon		
Pre-conditions:	ions: User has previously logged-in			
Post-conditions: Made for Leavers displays Login page until User changes pag		hanges pages		
Normal Flow:	1) User clicks logout icon			
	2) Made for Leavers deletes university from database			
Includes:	Made for Leavers logs-out User from Made for Leavers			
Priority:	8			

2.1.2. Data Requirements

Made for Leavers consists of one SQL Server database called Made_for_Leavers. This database consists of one table called Universities. This table consists of four columns called id, email, name, and webPage. id is an int that autoincrements when a row is added and is the primary key. email is a nvarchar that stores the email of a user and is used for select queries. name is a nvarchar that displays the name key of the JSON university object from the Hipo Labs API and is displayed via string interpolation between a tags. webPage is a nvarchar that displays the web_pages key of the JSON university object from the Hipo Labs API and is displayed via hrefs within a tags. The below table and image are the queries for the Made_for_Leavers database and Universities table and the ERD for the Made_for_Leavers database.

CREA	TE DATABASE Made_for_Leavers;
USE I	Made_for_Leavers;
CREA	TE TABLE Universities (id INT NOT NULL IDENTITY, email NVARCHAR(3248) NOT NULL, name NVARCHAR(3248) NOT NULL, webPage NVARCHAR(3248) NOT NULL, PRIMARY KEY(id)
);	

Made for Leaver	s E	RD - Daniel S	yrén (20105070)
		Universities	
	PK	id	
		email	
		name	
		webPage	

2.1.3. User Requirements

Users must be able to speak English as *Made for Leavers*' navigation bar is in English. Furthermore, the Hipo Labs API returns the names of the universities in English. However, a prospective student can change the language on the specific university website, which cater for different languages. As part of *Made for Leavers*' future work, languages beyond English are intended to be added to serve a greater coverage of its target market of prospective students around the world; including those who do not speak English.

2.1.4. Environmental Requirements

Firstly, users of *Made for Leavers* need to have access to the internet as the website is hosted appropriately via Azure. Secondly, users of *Made for Leavers* need to have access to an email as the website requires authentication and authorisation via Firebase.

2.1.5. Usability Requirements

Made for Leavers has no images. However, if *Made for Leavers* were to add images, alt text must be added to cater for images not loading. As part of *Made for Leavers'* future work, text-to-speech and a high-contrast mode are intended to be added to serve a greater coverage of its target market of prospective students around the world; including those who have vision impairments.

2.2. Design & Architecture

Made for Leavers has three main components. The internal *Made for Leavers* website, the external Hipo Labs API and the external Ninja AI. The internal *Made for Leavers* website interacts with the external Hipo Labs API and the external Ninja AI. For FR3, the internal *Made for Leavers* website passes a request to the Hipo Labs API to display all universities in inputted country or city. For FR5, the internal *Made for Leavers* website passes a request to the Ninja AI guidance counsellor. For FR1, FR2, FR4, FR6, FR7, and FR8, the internal *Made for Leavers* website handles creating, reading, and deleting with a database and registering, logging-in, and logging-out a user.

2.3. Implementation

The Angular front-end consists of a Register component, Login component, Search component, Ask component, and Load component. The Register component contains all the functionality for registering the user via Firebase and includes the method of onSubmit(). onSubmit() receives email and password, registers user, and navigates to search page. The Login component contains all the functionality for logging-in the user via Firebase and includes the method of onSubmit(). onSubmit() receives email and password, logs-in user, and navigates to search page. The Search component contains all the functionality interacting with the Hipo Labs API and includes the methods of displayUniversity(json: any[]), returnNumber(), rotateCountry(), saveUniversity(university: University), searchC(), searchCountry(country: string). displayUniversity(json: any[]) receives json, hides rotating countries, and displays all the universities in the entered country/city as links to their websites. returnNumber() generates and returns a random number between 0 and 171. rotateCountry() displays 4 random countries determined by returnNumber() and rotates them every 1.71 seconds. saveUniversity(university: University) receives university, calls a method of http service.ts, and gives a saved alert. searchC() concatenates entered country/city with the URL to create url that is passed into window.fetch(url). searchCountry(country: string) concatenates clicked country with the URL to create url that is passed into window.fetch(url). The Ask component contains all the functionality interacting with Ninja AI. The Load component contains all the functionality interacting with the database and includes the methods of loadUniversity() and removeUniversity(name: string). loadUniversity() receives universities from http and calls a method of http service.ts, and assigns the value of universities. removeUniversity(name: string) receives name, calls a method of http service.ts, and reloads saved universities. The below image is the searchC() method of the Search component of *Made for Leavers* that shows how the user input is verified as a country or city using the 172-length countries array.

```
searchC() {
    if (this.countries.includes(this.input.toLowerCase()) === true) {
        /*var url = "http://universities.hipolabs.com/search?country=" + this.input;*/
        var url = "https://madeforleaversms.azure-api.net/University/SearchUniversityCountry/" + this.input;
        window.fetch(url)
        .then(urlRes => urlRes.json())
        .then(jsonRes => this.displayUniversity(jsonRes));
    }
    else {
        /*var url = "http://universities.hipolabs.com/search?name=" + this.input;*/
        var url = "http://universities.hipolabs.com/search?name=" + this.input;*/
        var url = "http://madeforleaversms.azure-api.net/University/SearchUniversityCity/" + this.input;
        window.fetch(url)
        .then(urlRes => urlRes.json())
        .then(urlRes => urlRes.json())
        .then(urlRes => urlRes.json())
        .then(jsonRes => this.displayUniversity(jsonRes));
    }
}
```

2.4. Graphical User Interface (GUI)

The below image is the Register page of *Made for Leavers* with the email of "x20105070@student.ncirl.ie" and password of "*******".

⊡	Made for Leavers - Reg	jister		+					
←	\rightarrow C	0	۵	https://madeforlea	vers.azurewebsites.net/Register	☆	⊠ 9	റ്	≡
				Login		<u>Register</u>			
					x20105070@student.ncirl.ie				
					 Image: A set of the set of the				

The below image is the Login page of *Made for Leavers* with the email of "x20105070@student.ncirl.ie" and password of "*******".

⊡	Made for Leavers - Login			+								
←	C	0	۵	https://madeforlea	avers.azurewebsites.net/Login			☆		♥ ⊕	ப்	
				<u>Login</u>			R	egister				
					x20105070@student.ncirl.ie							
					_							

The below image is the Search page of *Made for Leavers* with the country of "ireland" about to be searched.

Made for Leavers - Search × +				
← → C O A https://madefo	orleavers.azurewebsites.net/Search		☆	ତ 🖲 ମୁ =
x20105070@student.ncirl.ie 😃				
Search	Ask		Load	
	0.000			
	Q ireland			
norway	united kingdom	canada	irelan	d

The below image is the Search page of *Made for Leavers* with the university of "National College of Ireland" about to be saved.

Made for Leavers - Search × +			
← → C O A https://madefo	orleavers.azurewebsites.net/Search	☆	ල 🖲 දු ≡
x20105070@student.ncirl.ie 🕛			
Search	Ask	Load	
	Q ireland		
	National College of Ireland		

The below image is the Ask page of *Made for Leavers* with the question of "What are the pros and cons of studying Computing at National College of Ireland?" about to be sent.



The below image is the Load page of *Made for Leavers* displaying all the saved universities with the university of "National College of Ireland" about to be deleted.

ē	M	lade for Leavers - Load	× +									
←		c O	A https://madefo	rleavers.azurewebsites.r	net/Load				☆	⊠ ⊜	ப	≡
x201	20105070@student.ncirl.ie											
		Sear	ch		Ask				Load			
					ational College of	Ireland I						
							•					

The below image is the prototype Search page of *Made for Leavers* with the country of "ireland" about to be searched.



The below image is the prototype Search page of *Made for Leavers* displaying all the Irish universities with the university of "Griffith College" about to be saved.

Kearch Ask
Search Load
ireian EARCH Athleme Institute of Technology SAVE Dublin City University SAVE Dublin Institute of Advanced Studies SAVE
Save

The below image is the prototype Load page of *Made for Leavers* displaying all the saved universities with the university of "Griffith College" about to be deleted.



2.5. Testing

Black box and white box testing are implemented on *Made for Leavers*. Black box testing consists of monkey/gorilla tests for functional requirements, Network Monitor for non-functional requirements, Postman for API tests, and Swagger for HTTP services tests. The below table shows the 21 monkey/gorilla functional requirements tests with the columns of #, Description, Input, Output, and Result.

#	Description	Input	Output	Result
1.1	User registers email and password; appropriate email and appropriate password	*clicks Register card* Email) x20105070@student. ncirl.ie Password) 20105070 *clicks check icon*	Made for Leavers signs-up User via email and password; *displays Search page*	Pass
1.2	User registers email and password; blank email and appropriate password	*clicks Register card* Email) Password) 20105070 *clicks check icon*	Made for Leavers displays error message if credentials are inappropriate; *displays auth/missing-email*	Pass

1.4	and password; appropriate email and blank password	Email) x20105070@student. ncirl ie	displays error message if credentials are inappropriate:	
1.4	appropriate email and blank password	Email) x20105070@student. ncirl ie	message if credentials	
1.4	blank password	x20105070@student.	are inappropriate.	
1.4		ncirl ie		
1.4		Tientine	*displays	
1.4			auth/missing-	
1.4		Password)	password*	
1.4				
1.4		*clicks check icon*		
	User registers email	*clicks Register card*	Made for Leavers	Pass
	and password; blank		displays error	
	email and blank	Email)	message if credentials	
	password		are inappropriate;	
		Password)	*displays	
			auth/invalid-email*	
1.5	User registers email	*clicks Register card*	Made for Leavers	Pass
	and password; used		displays error	
	email and appropriate	Email)	message if credentials	
	password	x20105070@student.	are inappropriate;	
		nciri.ie	*displays auth/email-	
			aiready-in-use*	
		Password) 20105070		
		clicks check icon		
1.6	User registers email	*clicks Register card*	Made for Leavers	Pass
	and password;	-	displays error	
	appropriate email and	Email)	message if credentials	
	weak password	x20105070@student.	are inappropriate;	
		ncirl.ie	*displays auth/weak-	
			password*	
		Password) 3248		
		clicks check icon		
2.1	User logs-in with email	*clicks Login card*	Made for Leavers	Pass
	and password; correct		signs-in User that	
	email and correct	Email)	entered correct email	
	password	x20105070@student.	and password;	
		ncirl.ie	*displays Search	
			page*	
		Password) 20105070		
		clicks check icon		
2.2	User logs-in with email	*clicks Login card*	Made for Leavers	Pass
	and password; blank	_	displays error	
	email and correct	Email)	message if credentials	
	password		are incorrect;	
2.2	oser logs-in with email and password; blank email and correct password	Email)	displays error message if credentials are incorrect;	Pass

		Password) 20105070	*displays	
			auth/invalid-email*	
		clicks check icon		
2.3	User logs-in with email	*clicks Login card*	Made for Leavers	Pass
	and password; correct		displays error	
	email and blank	Email)	message if credentials	
	password	x20105070@student.	are incorrect;	
		ncirl.ie	*displays	
			auth/missing-	
		Password)	password*	
		clicks check icon		
2.4	User logs-in with email	*clicks Login card*	Made for Leavers	Pass
	and password; blank		displays error	
	email and blank	Email)	message if credentials	
	password		are incorrect;	
		Password)	*displays	
			auth/invalid-email*	
		clicks check icon		
2.5	User logs-in with email	*clicks Login card*	Made for Leavers	Pass
	and password; invalid		displays error	
	email and correct	Email) 3248	message if credentials	
	password		are incorrect;	
		Password) 20105070	*displays	
			auth/invalid-email*	
2.6		*clicks check icon*		_
2.6	User logs-in with email	*Clicks Login card*	Made for Leavers	Pass
	and password; correct	Even all)	displays error	
	email and invalid	Email)	message if credentials	
	password	x20105070@student.	are incorrect;	
		ncin.ie	*uispiays	
		Descured) 2249	auth/invalid-	
		Password) 3248	credential*	
		clicks check icon		
3.1	User searches country	*clicks Search card*	Made for Leavers	Pass
	or city; typed-valid		displays all	
	country	Country) burkina faso	universities in	
			inputted country or	
		clicks search icon	city; *displays	
			Université de	
			Ouagadougou*	
3.2	User searches country	*clicks Search card*	Made for Leavers	Pass
	or city; typed-valid city		displays all	
		City) durban	universities in	
			inputted country or	
		clicks search icon	city; *displays Durban	

Pass
Pass
Pass
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Dacc
Pass
Dacc
rass
Pass
Pass
Pass

The below images show the 7 Network Monitor non-functional requirements tests with a focus on finishing time. Firstly, *Made for Leavers* signs-up User via email and password < 2 seconds passed because 1.51 s < 2 seconds.

Status	3			Method
200				OPTIONS
200				POST
200				OPTIONS
200				POST
200				OPTIONS
200				POST
Ō	6 requests	2.57 kB / 5.07 kB transferred	Finish: 1	I.51 s

Secondly, *Made for Leavers* signs-in User that entered correct email and password < 1 second passed because 599 ms < 1 second.

Status	Method					
200	OPTIONS					
200	POST					
200	OPTIONS					
200	POST					
🕗 4 requests 🛛 2.33 kB / 3.75 kB transferred 🚽 Finish: 599 ms						

Thirdly, *Made for Leavers* displays all universities in inputted country or city < 1 second passed because 185 ms < 1 second.

Status				Method
200				GET
Ō	1 request	4.66 kB / 1.71 kB transferred	Finish: 18	35 ms

Fourthly, *Made for Leavers* posts university into database < 2 seconds passed because 201 ms < 2 seconds.

Status	5			Method
200				OPTIONS
204				POST
Ō	🧿 2 requests 🛛 0 B / 1.70 kB transferred 🔷 Finish: 201 r		Finish: 201	ms

Status				Method
204				POST
200				OPTIONS
200				POST
200				GET
204				POST
200				GET
200				GET
204				POST
200				GET
Ō	18 requests	50.01 kB / 6.38 kB transferred	Finish	n: 3.59 s

Fifthly, *Made for Leavers* provides answers via Ninja AI guidance counsellor < 5 seconds passed because 3.59 s < 5 seconds.

Sixthly, *Made for Leavers* gets universities from database < 2 seconds passed because 720 ms < 2 seconds.

Status	Method
200	GET
200	OPTIONS
200	POST
200	GET
200	OPTIONS
200	GET
🙋 12 requests 687.01 kB / 312.48 kB transferred F	inish: 720 ms DOMContentLoaded: 54 ms load: 205 ms

Seventhly, *Made for Leavers* deletes university from database < 2 seconds passed because 399 ms < 2 seconds.

Status	Method				
200	OPTIONS				
204	DELETE				
200	OPTIONS				
200	GET				
🧿 4 requests 2 B / 2.17 kB transferred Finish: 399 ms					

The below images show the 3 Postman API tests with the successful GET, DELETE, and POST requests returning 200, 204, and 204 HTTP status codes respectively.

GET https://madeforleaversm: + ****								
前 https://madeforleaversms.azure-api.net/University/GetUniversity								
GET v https://madeforleaversms.azure-api.net/University/Ge	tUniversity Send ~							
Params Authorization Headers (8) Body Pre-request Script	Tests Settings Cookies							
Accept (1)	*/*							
Accept-Encoding (1)	gzip, deflate, br							
Connection (1)	keep-alive							
Authorization	x20105070@student.ncirl.ie							
Кеу								
Body Cookies (2) Headers (7) Test Results	€ 200 OK 200 ms 342 B Save Response ✓							
Pretty Raw Preview Visualize JSON ~ 异	E Q							
<pre>1 [2</pre>								

DEL https://madeforleaversms + ***							
https://madeforleaversms.azure-api.net/University/GetUniversity	y 🖺 Save						
DELETE V https://madeforleaversms.azure-api.net/University	/DeleteUniversity/National College of Ireland						
Params Authorization Headers (8) Body Pre-request Scri	pt Tests Settings Cookies						
Accept (1)	*/*						
Accept-Encoding (1)	gzip, deflate, br						
Connection (1)	keep-alive						
Authorization	x20105070@student.ncirl.ie						
Key							
Body Cookies (2) Headers (3) Test Results	🛱 204 No Content 280 ms 111 B Save Response 🗸						
Pretty Raw Preview Visualize Text ~ 🔫	Γ Q						
1							

POST https://madeforleaversn + ****								
https://madeforleaversms.azure-api.net/University/GetUniversity								
POST v https://madeforleaversms.azure-api.net/University/PostUniversity								
Params Authorization Headers (10) Body • Pre-request Script Tests Settings	Cookies							
🔵 none 🜑 form-data 🜑 x-www-form-urlencoded 💿 raw 🜑 binary JSON 🗸	Beautify							
<pre>1 { 2</pre>								
Body Cookies (2) Headers (3) Test Results	ave Response 🗸							
Pretty Raw Preview Visualize Text V	a							
1								

The below images show the Swagger HTTP services tests with the University GET, DELETE, and POST requests and the University schema and the Swagger page showing the successful University POST request with a 204 HTTP status code.

🖻 🕒 Swagger UI	× +		
$\leftrightarrow \rightarrow \mathbf{C}$	O A https://localhost.3248/swagger/index.html	☆	ල ා දා ≡
Made_for			
University			^
GET /Univer	sity/GetUniversity		~
DELETE /Univer	rsity/DeleteUniversity/{name}		~
POST /Univer	sity/PostUniversity		\sim
Schemas			^
University ~ { id email name webPage }	<pre>integer(\$int32) string nullable: true string nullable: true nullable: true</pre>		

Ō	\varTheta Swagge	rUI X	+				~		٥	×
	\rightarrow C	0 e	https://localhost:3248/			☆) <u>එ</u>	=
and the second	Curl eurl - X 'PO' 'https:// -H 'accep -H 'conte -d '("d": o, "emsil": "mabrage" }' Request URL https://lo Server respor Code 204 Undocumented	st' \ localhost:3248/Univer t: */*' \ "string", "string", : "string" calhost:3248/Universit use Details Response headers	sity/PostUniversity'∖ json'∖ y/PostUniversity						¢.	
	Responses	access-control-all date: Sat,27 Jul 2 server: Kestrel x-firefox-spdy: h2	ow-origin: * 024 08:10:17 GMT						_inks	
	200	Success						1	Vo links	r)

White box testing consists of Jasmin/Karma for unit tests. The below image shows the Jasmin/Karma unit tests with all 7 specs finishing in 0.235s.



2.6. Evaluation

Made for Leavers passed 100% of its black box tests that consist of monkey/gorilla tests for functional requirements, Network Monitor for non-functional requirements, Postman for API tests, and Swagger for HTTP services tests. *Made for Leavers* passed 100% of its white box tests that consist of Jasmin/Karma for unit tests. Smoke tests are conducted regularly in addition to regression tests.

3.0 Conclusions

Looking at the closest competition of *Made for Leavers*, which is University Hub, there are some similarities and differences. Firstly, University Hub is a centralised universities hub, but its scope is different to what Made for Leavers' is. This is because University Hub is only a centralised universities hub for some of the universities in the USA, Canada, and the UK, while *Made for Leavers* is a centralised hub for every university in the world (Anon, 2022). Thus, an advantage of Made for Leavers is that its search function caters for more universities than University Hub's. Secondly, University Hub does have a guidance counsellor service, but it is not as available as what Made for Leavers' is. This is because University Hub uses human guidance counsellors that one needs to make appointments with, while Made for Leavers uses a Ninja AI system to have the service available 24/7 (Anon, 2022). Thus, an advantage of *Made for Leavers* is that its ask function is more readily available than University Hub's. A first disadvantage of Made for Leavers is that it does not have direct partnerships with universities, while University Hub does (Anon, 2022). A second disadvantage of Made for Leavers is that it does not have a free IELTS & Duolingo Coaching service, while University Hub does (Anon, 2022). The below image is the University Hub website.



4.0 Further Development or Research

Firstly, as part of *Made for Leavers'* future work, languages beyond English are intended to be added to serve a greater coverage of its target market of prospective students around the world; including those who do not speak English. Secondly, as part of *Made for Leavers'* future work, text-to-speech and a high-contrast mode are intended to be added to serve a greater coverage of its target market of prospective students around the world; including those who have vision impairments. Thirdly, *Made for Leavers* is hosted on Azure's free tier and has Firebase authentication, however, it is intended for *Made for Leavers* to be hosted on Azure's enterprise tier and for authentication to be upgraded from Firebase in the future. The below images are the madeforleavers at https://madeforleavers.azurewebsites.net/ and the madeforleavers authentication project on Firebase with the user x20105070@student.ncirl.ie.

Resource group		as - Maus y 🕅 Delete	Executionalista
Filter for any field Type equals all × Location equals all × †7 Add	I filter	gs - Move - III Delete	v cxport template
Showing 1 to 7 of 7 records. Show hidden types		No grouping	✓ == List view
Name 1	Type ↑↓	Location ↑↓	
ASP-madeforleaversrg-aea2	App Service plan	North Europe	
Made_for_Leavers (madeforleaverssql/Made_for_Leavers)	SQL database	North Europe	
🗌 🧔 madeforleavers	App Service	North Europe	
🗌 🔕 madeforleaversapi	App Service	East US	
MadeforLeaversApi20240706144056Plan	App Service plan	East US	
G S madeforleaversms	API Management service	North Europe	
🗖 modeforlesverreal	SOL server	North Europe	



5.0 References

Anon, (2022). *Best US Study Abroad Consultant - Admission Consultants | University Hub.* [online] Available at: <u>https://universityhub.com/#</u> [Accessed 2 Aug. 2024]. 6.0 Appendices 6.1. Project Proposal



National College of Ireland

Computing Project Proposal *Made for Leavers* 5 August 2024

Daniel Syrén, 20105070, x20105070@student.ncirl.ie

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State of the Art	. 2
Technical Approach	.3
Functional Requirements	. 3
Non-Functional Requirements	.3
Technical Details	.3
Special Resources Required	.4
Project Plan	.4
Testing	.4

Objectives

The project is called *Made for Leavers* as it is made for prospective students, mostly school leavers, who are looking to leave their country or city to study. Thus, the one primary objective of this project is to provide a website that helps prospective students find their right university in their right country or city. This one primary objective will be achieved by the successful implementation of this project's two secondary objectives. Firstly, *Made for Leavers* must be a centralised universities hub that takes a user's input of a country or city and outputs all the universities in that country or city as clickable links to their websites, which can be saved, loaded, and removed from a database. Secondly, *Made for Leavers* must have a Ninja AI system embedded into *Made for Leavers* that acts as a quasi-guidance counsellor to prospective students. The API/AI of the Hipo Labs API and the Ninja AI will help prospective students find their right university in their right country or city.

Background

Prospective students around the world experience barriers when embarking on the journey of finding the right university for them. These barriers range from prospective students experiencing zero-motivation to anxiety. For prospective students looking to study in a different country or city, these barriers are heightened. Based on this, *Made for Leavers* attempts to provide a website that will enable prospective students to get all the information they need with regards to leaving and studying in another country or city. Once again, the one primary objective of *Made for Leavers* is to provide a website that helps prospective students find their right university in their right country or city. Once again, this one primary objective will be achieved by the successful implementation of this project's two secondary objectives. These secondary objectives can be summarised by *Made for Leavers* is a demand for such a website and there is currently no supply of such a website.

State of the Art

Looking at the closest competition of *Made for Leavers*, which is University Hub, there are some similarities and differences. Firstly, University Hub is a centralised universities hub, but its scope is different to what *Made for Leavers*' will be. This is because University Hub is only a centralised universities hub for some of the universities in the USA, Canada, and the UK, while *Made for Leavers* will be a centralised hub for every university in the world. Secondly, University Hub does have a guidance counsellor service, but it is not as available as what *Made for Leavers*' will be. This is because University Hub uses human guidance counsellors that one needs to make appointments with, while *Made for Leavers* will use a Ninja AI system to have the service available 24/7.
Technical Approach

The project will follow a Test-Driven Development approach. In other words, software requirements will be turned into test cases before being turned into code. These software requirements will be directly derived from the primary and secondary objectives of *Made for Leavers*. These requirements will be broken into project tasks following a quasi-scrum model where, despite it being an individual project, a scrum system will be implemented. Project tasks, activities, and milestones will be broken-down into sprints.

Functional Requirements

ID	Description	Priority
FR1	Made for Leavers signs-up User via email and password	6
FR2	Made for Leavers signs-in User that entered correct email and password	7
FR3	Made for Leavers displays all universities in inputted country or city	1
FR4	Made for Leavers posts university into database	2
FR5	Made for Leavers provides answers via Ninja AI guidance counsellor	3
FR6	Made for Leavers gets universities from database	4
FR7	Made for Leavers deletes university from database	5
FR8	Made for Leavers logs-out User from Made for Leavers	8

ID	Description	Timeframe
NFR1	Made for Leavers signs-up User via email and password	< 2 seconds
NFR2	Made for Leavers signs-in User that entered correct email and password	< 1 second
NFR3	Made for Leavers displays all universities in inputted country or city	< 1 second
NFR4	Made for Leavers posts university into database	< 2 seconds
NFR5	Made for Leavers provides answers via Ninja Al guidance counsellor	< 5 seconds
NFR6	Made for Leavers gets universities from database	< 2 seconds
NFR7	Made for Leavers deletes university from database	< 2 seconds
NFR8	Made for Leavers logs-out User from Made for Leavers	< 1 second

Non-Functional Requirements

Technical Details

Made for Leavers will use an Angular front-end, C# back-end, and SQL Server database. Azure will be used to host the website and Firebase will be used for login authentication and authorisation. In terms of API/AI, the Hipo/university-domains-list-api will be used to retrieve all the universities in a particular country or city and the Ninja AI will be used to facilitate a Ninja AI guidance counsellor.

Special Resources Required

A declaration of ethics consideration will be required for *Made for Leavers* as it makes use of public secondary datasets. An ethics application form is currently not required for *Made for Leavers*. However, an ethics application form will be required if testing is expanded to include surveys given to human participants.

Project Plan

In January, the software requirements specification will be finalised as it is a requirement in a Test-Driven Development approach that the software requirements specification is completed before the test plan with test cases are developed. In February, the test plan with test cases will be finalised as it is a requirement in a Test-Driven Development approach that the test plan and test cases are completed before coding begins. In March, 0.5/2 of *Made for Leavers'* API/AI must be implemented and tested to be on course to have 50% of development completed for the midpoint implementation in May. In April, 1/2 of *Made for Leavers'* API/AI must be implemented and tested to have 50% of development completed for the midpoint in May. In June, 1.5/2 of *Made for Leavers'* API/AI must be implemented and tested to have 50% of development completed and tested to be on course to have 50% of development implementation in May. In June, 1.5/2 of *Made for Leavers'* API/AI must be implemented to be on course to have 100% of development completed for the final implementation in August. In July, 2/2 of *Made for Leavers'* API/AI must be implemented and tested to have 100% of development completed for the final implementation in August. In July, 2/2 of *Made for Leavers'* API/AI must be implemented and tested to have 100% of development completed for the final implementation in August. In July, 2/2 of *Made for Leavers'* API/AI must be implemented and tested to have 100% of development completed for the final implementation in August. In July, 2/2 of *Made for Leavers'* API/AI must be implemented and tested to have 100% of development completed for the final implementation in August.

Month	Milestone
January	Finalise software requirement specification
February	Finalise test plan with test cases
March	Have 0.5/2 API/AI integrated with testing
April	Have 1/2 API/AI integrated with testing
May	Midpoint implementation
June	Have 1.5/2 API/AI integrated with testing
July	Have 2/2 API/AI integrated with testing
August	Final implementation

Testing

Black box and white box testing will be implemented on *Made for Leavers*. Black box testing will consist of monkey/gorilla tests for functional requirements, Network Monitor for non-functional requirements, Postman for API tests, and Swagger for HTTP services tests. White box testing will consist of Jasmin/Karma for unit tests. Smoke tests will be conducted regularly in addition to regression tests. The below table shows the columns that monkey/gorilla test cases will contain.

#	Description	Input	Output	Result

6.2. Declaration of Ethics Consideration



National College of Ireland

Declaration of Ethics Consideration *Made for Leavers* 5 August 2024

e of Ireland	National
CS CONSIDERATION	College ^{of} Ireland

DECLARATION OF ETHICS CONSIDERATION

School of Computing

udent ime:	Daniel Syrén
udent ID:	20105070
ogramme	BSc (Honours) in Computing (BSHCE15) Year: 4
odule:	Computing Project
oject	Made for Leavers
Please circle	e (or highlight) as appropriate

This project involves human participants	Yes / <mark>No</mark>	

Introduction

Secondary data refers to data that is collected by someone other than the current researcher. Common sources of secondary data for social science include censuses, information collected by government departments, organizational records and data originally collected for other research purposes. Primary data, by contrast, is collected by the investigator conducting the research.

A project that does not involve human participants requires ONLY completion of Declaration of Ethics Consideration Form and submission of the form on module's Moodle page

A project that involves human participants requires ethical clearance and an Ethics Application Form must be submitted through the module's Moodle page. Please refer to and ensure compliance with the ethical principles stated in NCI Ethics Form available on the Moodle page.

The following decision table will assist you in deciding if you have to complete the Declaration of Ethics Consideration Form or/and the Ethics Application Form.

Public Data	Υ	Y	Y	Y	Ν	Ν	Ν	Ν
Private Data	Υ	Υ	Ν	Ν	Υ	Y	Ν	Ν
Human Participants	Υ	Ν	Υ	Ν	Y	Ν	Υ	Ν
Declaration of Ethics								
Consideration Form	х	Х	х	Х	Х	Х	х	
Ethics Application Form	Х		Х		Х		Х	

Please circle (or highlight) as appropriate

The project makes use of secondary dataset(s) created by the researcher	
The project makes use of public secondary dataset(s)	<mark>Yes</mark> / No
The project makes use of non-public secondary dataset(s)	Yes / <mark>No</mark>
Approval letter from non-public secondary dataset(s) owner received	Yes / <mark>No</mark>

Sources of Data:

It is students' responsibility to ensure that they have the correct permissions/authorizations to use any data in a study. Projects that make use of data that does not have authorization to be used, will not be graded for that portion of the study that makes use of such data.

<u>Public Data</u>

A project that makes use of public secondary dataset(s) **<u>does not need ethics permission</u>**, but **<u>needs a letter/email from the copyright holde</u>r** regarding potential use.

Some websites and data sources allow their data sets to be used under certain conditions. In these cases, a letter/email from the copyright holder is NOT necessary, but the researcher should cite the source of this permission and indicate under what conditions the data are allowed to be used. See Appendix I for examples of permissions granted by Fingal Open Data, and Eurostat website.

Where websites or data sources indicate that they do not grant permission for data to be used, you will still need a letter/email from the copyright holder. For example, see Appendix II for an example from the Journal of Statistics Education.

<u>Private Data</u>

A project that makes use of non-public (private) secondary dataset(s) must receive data usage permission from School of Computing.

An approval letter/email from the owner (e.g. institution, company, etc.) **of the nonpublic secondary dataset** <u>must be attached</u> **to the Declaration of Ethics Consideration**. The letter/email must confirm that the dataset is anonymised and permission for data processing, analysis and public dissemination is granted.

Evidence for use of secondary dataset(s)

Include dataset(s) owner letter/email or cite the source for usage permission

You can use this data source in three ways:

- Use the JSON file as your data source and do whatever you like with your favourite programming language.
- Use free hosted-API.
- Use the tiny Python app to serve a fast API that you can query data.

https://github.com/hipo/university-domains-list

4. Use restrictions

You may use the Services only for lawful purposes and in accordance with this Agreement and NinjaTech's Acceptable Use Policy ("Acceptable Use Policy"), the current version and any updated versions of which is available at https://www.ninjatech.ai/terms-of-use and is hereby incorporated by reference. You acknowledge that we may (a) revise the Acceptable Use Policy in our sole discretion, from time to time, and (b) notify you of any such revision by any reasonable means, including by posting such revised Acceptable Use Policy through or in connection with the Services or our website. You acknowledge and agree that the Services may be subject to limits on the amount of your use (e.g., rate limits) that correspond to the tier of service obtained by you.

https://myninja.ai/terms-of-service

CHECKLIST

Non-public/private secondary dataset(s) -Owner letter/email is	Yes / Nc
OR	
Citation and link to the web site where permission is granted – provided in this form	<mark>Yes</mark> / Nc

ETHICS CLEARANCE GUIDELINES WHEN HUMAN PARTICIPANTS ARE INVOLVED

The Ethics Application Form must be submitted on Moodle for approval prior to conducting the work.

Considerations in data collection

• Participants will not be identified, directly or through identifiers linked to the subjects in any reports produced by the study

Informed consent

- Consent to participate in the study has been given freely by the participants
- participants have the capacity to understand the project goals.
- Participants have been given information sheets that are understandable
- Likely benefits of the project itself have been explained to potential participants
- Risks and benefits of the project have been explained to potential participants
- Participants have been assured they will not suffer physical stress or discomfort or psychological or mental stress
- The participant has been assured s/he may withdraw at any time from the study without loss of benefit or penalty
- Special care has been taken where participants are unable to consent for themselves (e.g children under the age of 18, elders with age 85+, people with intellectual or learning disability, individuals or groups receiving help through the voluntary sector, those in a subordinate position to the researcher, groups who do not understand the consent and research process)
- Participants have been informed of potential conflict of interest issues
- The onus is on the researcher to inform participants if deception methods have to be used in a line of research

I have read, understood, and will adhere to the ethical principles described above in the conduct of the project work.

Signature:	Danell Sylle
Date:	4/7/2024

Appendix I

1) Fingal Open Data: http://data.fingal.ie/About

Licence

Citizens are free to access and use this data as they wish, free of charge, in accordance with the Creative Commons Attribution 4.0 International License (CC-BY).

Note: From November 2010 to July 2015, data on Fingal Open Data was published in accordance with the PSI general licence.

Use of any published data is subject to Data Protection legislation.

Licence Statement

Under the CC-BY Licence, users must acknowledge the source of the Information in their product or application by including or linking to this attribution statement: "Contains Fingal County Council Data licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence".

Multiple Attributions

If using data from several Information Providers and listing multiple attributions is not practical in a product or application, users may include a URI or hyperlink to a resource that contains the required attribution statements.

2) Eurostat: https://ec.europa.eu/eurostat/about/policies/copyright

COPYRIGHT NOTICE AND FREE RE-USE OF DATA

Eurostat has a policy of encouraging free re-use of its data, both for non-commercial and commercial purposes. All statistical data, metadata, content of web pages or other dissemination tools, official publications and other documents published on its website, with the exceptions listed below, can be reused without any payment or written licence provided that:

- the source is indicated as Eurostat
- when re-use involves modifications to the data or text, this must be stated clearly to the end user of the information

Appendix II

Journal of Statistics Education: http://jse.amstat.org/jse_users.htm

JSE Copyright and Usage Policy

Unlike other American Statistical Association journals, the Journal of Statistics Education (JSE) does not require authors to transfer copyright for the published material to JSE. Authors maintain copyright of published material. Because copyright is not transferred from the author, permission to use materials published by JSE remains with the author. Therefore, to use published material from a JSE article the requesting person must get approval from the author.

6.3. Reflective Journals



National College of Ireland

(31) Days of October*Made for Leavers*5 November 2023

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	N/A

Month: October

What?

Days 1-25, I considered using my Academic Internship project as a starting point. For context, I created a locally hosted hub that allows a single user to input a country/city and the hub outputs the website links of all the universities in the country/city. The user can then save, load, and delete links from a local database. I planned to evolve this project in ways relevant to Cybersecurity. Firstly, I wanted to host the website and database online. Secondly, I wanted to have a username and password system. Thirdly, I wanted to improve API filtering to have one search page. Fourthly, I wanted to improve the database with data encryption. Fifthly, I wanted to improve the overall UI/UX. I recorded a pitch for this idea. Days 1-25, I paradoxically experienced both confidence and doubt. I experienced confidence as I felt that I was a step ahead of the rest of my class because I already had a project idea that I was passionate about. However, I experienced doubt as I was questioning whether-ornot the project I described in my first pitch was original and complex enough.

Days 26-31, I reconsidered this idea after talking to my lecturer. I then decided to increase the originality and complexity of the idea. I gave my idea an original identity of being a universities hub for international students and I gave my idea more complex features. Firstly, I wanted to host the website and database online using Azure. Secondly, I wanted to have username and password authentication using Firebase. Thirdly, I wanted to redo the TypeScript, HTML, and CSS. Fourthly, I wanted to use a Google Maps API to show universities on a map. Fifthly, I wanted to use a city information API to help international students. I rerecorded a pitch for this idea and uploaded it to YouTube. Days 26-31, I ironically experienced even more confidence and even more doubt. I experienced even more doubt after speaking with my lecturer on whether-or-not the project I described in my first pitch was original and complex enough. However, I experienced even more confidence when I gave my idea more complex features in my second pitch.

So What?

In the present, when I think how lucky I am to wake up next to my project every morning, I cannot help but be amazed at how easy it all really was. I am pleased that I handled the challenges of increasing my project's originality and complexity in the short time between the call with my lecturer and the due date of the pitch. Presently, I call my project *Made for Leavers* because it is made for both leavers of secondary education and leavers of a country or city. I am currently researching APIs that I can use for the development of my project. This allows me to feel that I am taking action to affect the outcome of my project, while waiting to hear what the outcome is of my pitch and who will be my supervisor.

Now What?

In the future, I am excited by the prospect of furthering my knowledge in Angular, C#, and SQL Server. At NCI, I have studied an array of front-ends, back-ends, and databases. However, I feel that I have found my favourite combination with an Angular front-end, C# back-end, and SQL Server database. In terms of juxtaposing expectations and reality, I will ask my lecturer/supervisor any questions that I have in greater advance of deadlines to prevent the threat of running out of time. I found it easy to solve the challenges of increasing my project's originality and complexity in the short time between the call with my lecturer and the due date of the pitch. However, I am aware that future challenges, with regards to solving, will have a long, difficult road.

Student Signature

Panell Syll



(30) Days of November*Made for Leavers*3 December 2023

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: November

What?

Days 1-21, I arranged a meeting with my supervisor and prepared questions that I wanted to ask in the meeting. The most important question that I wanted answered was whether-or-not *Made for Leavers* was approved based on the red-light, orange-light, and green-light system. Red-light would indicate that I would fail the module if I successfully produced *Made for Leavers*. Orange-light would indicate that I would pass the module if I successfully produced *Made for Leavers*. Green-light would indicate that I would get 1st class honours in the module if I successfully produced *Made for Leavers*. Green-light would indicate that I would get 1st class honours in the module if I successfully produced *Made for Leavers*. Days 1-21, once again, I paradoxically experienced both confidence and doubt. I experienced confidence as I felt that *Made for Leavers* having a university-website API, a Google-Maps API, and a city-information API would be enough for at least an orange-light approval. However, I experienced doubt as I was questioning whether-or-not *Made for Leavers* would be viewed in the same way by my supervisor.

Day 22-30, I met with my supervisor and was given an orange-light approval for *Made for Leavers*. However, it was recommended that I find a way to synergise my 3 APIs into a single unique selling point to change *Made for Leavers* from having an orange-light approval to a green-light approval. I spent the remainder of November brainstorming ways that I could change *Made for Leavers* from a minimum viable product that emphasised the theory of structuralism to a minimum viable product that emphasised the theory of gestaltism. Days 22-30, for the first time this module, I experienced confidence without doubt. The fact that *Made for Leavers* was given an orange-light approval was the catalyst for this feeling and I could confidently pursue ways to move forward with *Made for Leavers* as opposed to starting over.

So What?

In the present, when I think how lucky I am to not be waiting to hear what the outcome is of my pitch and who will be my supervisor, I cannot help but be amazed at how easy the end of November is compared to the end of October. I am pleased

that I asked my supervisor all the questions that I had, which is something I mentioned that I wanted to do in my October journal. Presently, I am still happily contemplating ways that I can link my 3 APIs together. This process is easier knowing that *Made for Leavers* has been given an orange-light approval compared to researching APIs when I did not know the outcome of my pitch at the end of last month.

Now What?

In the future, I am still excited by the prospect of furthering my knowledge in Angular, C#, and SQL Server. I will particularly focus on the QA side as I am currently progressing to the interview stage of a software tester graduate program. In terms of juxtaposing expectations and reality, I will ask my supervisor any questions that I have with regards to my project proposal in our next meeting. This should help me get a green-light approval for my gestalt version of *Made for Leavers* in my project proposal. If this happens, 2024 may have a long, easy road.

Student Signature

Panell Syll



(31) Days of December*Made for Leavers*7 January 2024

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: December

What?

Days 1-17, I worked on how I could link my 3 APIs together. However, I felt that I did not have as much time as I would have liked to for focusing on this Computing Project module because of other deliverables. Firstly, the project for my Cloud Application Development module was due on 13 December. Secondly, the project for my Secure Application Programming module was due on 17 December. Thirdly, the 10-minute presentation for my graduate program interview was on 20 December. During this time, I decided that the way to create a unique selling point of my website was to add a fourth API; not combining the 3 APIs into a single API. The fourth API that I decided to add is a ChatGPT-esque API that will serve as a guasi-guidance counsellor on Made for Leavers. The unique selling point will be in the form of Made for Leavers halving its 4 APIs into 2 APIs per part of its primary objective. The primary objective of Made for Leavers is to provide a website that helps prospective students find their right university in their right country or city. The APIs of the Hipo Labs API and the ChatGPT-esque API will focus on helping prospective students to find their right university. The APIs of the Google Maps API and the city-information API will focus on helping prospective students to find their right country or city.

Days 18-31, I met with my supervisor and was given a greener-orange-light approval for *Made for Leavers*. It was recommended that I write my project proposal with that in mind, while remembering that I could still be flexible with regards to *Made for Leavers* in the future. I was glad that my idea was received positively, but I was unhappy about the amount of time I had to complete my project proposal. My project proposal was due on 20 December, the same day as my 10-minute presentation for my graduate program interview. I considered my options, but I prioritised working on my 10-minute presentation for my graduate program interview. This decision was confidently made because an impressive interview would pretty much guarantee my place on the graduate program, while I did not doubt that I went on to be happy with my presentation and my project proposal after a long day. 2023 had come to an end.

So What?

In the present, when I think how lucky I am to have made all my deadlines in December, I cannot help but be amazed at how difficult December was compared to November. I am pleased that I managed my time in the way that I did as I know that it had a positive effect. Presently, I am remembering that I need to recharge over Christmas in preparation for the fight of the coming semester. However, I am keeping an eye on the project plan that I included in my project proposal to remain aware of coming deadlines, especially after this month. This process is easier knowing that January will not be as long and difficult as December.

Now What?

In the future, I am still excited by the prospect of furthering my knowledge in Angular, C#, and SQL Server. I included my knowledge of Angular, C#, and SQL Server in my 10-minute presentation for my graduate program interview, which I have since been informed has successfully moved me forward to the next interview stage. In terms of juxtaposing expectations and reality, I will ask my supervisor exactly what I need to do to go from a greener-orange-light approval to a green-light approval. Knowing this should help me start 2024 on the right foot. I feel that the year 2024 is going to make a great year.

Student Signature	Zanlle Sylle
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(31) Days of January *Made for Leavers*4 February 2024

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: January

What?

Days 1-9, I took a break from *Made for Leavers* as I focused on preparing for my second interview for my graduate programme, which I completed on 9 January. After the interview, I knew that I would find out if I was successful in the next couple of days. Days 10-11, I felt like months had passed as I impatiently waited for a call. On 11 January at 14:50, I received a call, was informed that my interview feedback was positive, and I got the job on BearingPoint's 2024 graduate programme as a Software Tester. I felt over the moon with the news and was reassured by my decision to return to university to study computing. 11 January was day 1206 of my studying of the Bachelor of Science (Honours) and I was glad that each one of them was worth it. Days 12-31, I prepared for my return to NCI and reprised my role as a student with everything falling slowly into place.

So What?

In the present, when I think how lucky I am to be on BearingPoint's 2024 graduate programme as a Software Tester, I cannot help but be amazed at how easy it all really was. I am pleased that I persisted from 2020 to 2024 because things fall apart, things get put back together. Presently, I am remembering that I need to start working on *Made for Leavers*' Requirement Specification in February as it is due on 3 March.

Now What?

In the future, I need to find the exact APIs that I will be using in *Made for Leavers*. I have given a green light for the Hipo Labs API, an orange light for the city-information API, and red lights for the Google Maps API and the ChatGPT-esque API. This highlights areas for research. In terms of juxtaposing expectations and reality, 2024 has been a much better year than I could have imagined, I am determined to continue that pattern once going into a deceptively short February.

Student Signature



(29) Days of February*Made for Leavers*3 March 2024

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: February

What?

Days 1-22, I worked on the requirement specification of *Made for Leavers*. During this time, I identified the 8 use cases of *Made for Leavers*. These use cases are User enters country or city and clicks SEARCH, User selects searched university and clicks SAVE, User clicks LOAD, User selects loaded university and clicks DELETE, User enters username and password and clicks LOGIN, User enters question on ChatGPT counsellor and clicks SEARCH, User enters university and clicks SEARCH, and User enters city and clicks SEARCH. I was happy to have identified these use cases as it enabled me to have a better vision for the final product of *Made for Leavers*. However, with that in mind, I did begin to question how I was going to prioritise my use cases, which I highlighted as the key point of discussion for when I met with my supervisor.

Days 18-29, I met with my supervisor and was able to visualise an appropriate way to prioritise *Made for Leavers*' use cases. Firstly, it was decided that the search functionality is the most important functionality of Made for Leavers, thus, User enters country or city and clicks SEARCH was given priority 1. Secondly, it was decided that the database functionalities are the second-most important functionalities of *Made for Leavers*, thus, User selects searched university and clicks SAVE, User clicks LOAD, and User selects loaded university and clicks DELETE were given priorities 2-4. Thirdly, it was decided that the login functionality is the second-least important functionality of Made for Leavers, thus, User enters username and password and clicks LOGIN was given priority 5. Lastly, it was decided that the other functionalities are the least important functionalities of Made for Leavers, thus, User enters question on ChatGPT counsellor and clicks SEARCH, User enters university and clicks SEARCH, and User enters city and clicks SEARCH were given priorities 6-8. I was relieved to have set the appropriate priorities for the different use cases as I was able to start to set a timeline for development prioritising the most important use cases first.

So What?

In the present, I am pleased that I managed to prioritise each of my 8 use cases in a way that I feel is accurate. I am glad that I have completed the requirement specification because it can now be referenced as I look to start development soon. I am conscious of the deadline schedule and am aware that the next deliverable is the midpoint implementation, documentation, and video presentation, which is due on 28 April. Paradoxically, I feel both excited and exhausted about that fact.

Now What?

In the future, I am going to develop an updated timeline for development that goes from the highest priority of 1 to the lowest priority of 8. I plan to complete this timeline and begin development on St Patrick's Day. Thus, I am looking forward to this coming month as I know that any questions about the implementation of *Made for Leavers* will begin to be answered when I start transforming my project proposal and requirement specification into a website using Angular, C#, and SQL Server.

Student Signature

Panell Syll



(31) Days of March *Made for Leavers* 7 April 2024

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: March

What?

Days 1-7, I worked on my Penetration Testing CA. During this time, work on *Made for Leavers* was halted as the CA was released on 4 March and was due on 10 March. I felt annoyed that *Made for Leavers* was ironically left as little time was available for non-CA work. I felt this way because I would have liked greater flexibility with regards to completing the CA because flexibility is often needed as a part-time student.

Day 8, I met with my supervisor. During this time, I focused on discussing the ChatGPT counsellor of *Made for Leavers* and had helpful conversations when juxtaposing GPT-3.5 and GPT-4. I still felt undecided with regards to using GPT-3.5 or GPT-4 and was going to do further research in March. I felt this way because I was still thinking about having paid €19.89 to host a previous project on Heroku and using GPT-4 would require me to pay \$20 per month for ChatGPT Plus and that would be required for a few months.

Days 9-31, I continued to work on my Penetration Testing CA and began working on my Digital Forensics CA. Once again, during this time, work on *Made for Leavers* was halted as the CA was released on 7 March and was due on 28 March. I felt proud of the two CAs I submitted in March, but I also felt disappointed with how *Made for Leavers* gathered moss on St Patrick's Day. I felt this way because I was hoping to have started development on St Patrick's Day, but I conducted research on ChatGPT's Earth plugin instead.

So What?

In the present, I feel proud of the two CAs I submitted in March, but I also felt disappointed with how *Made for Leavers* gathered moss in March. Paralysingly, with

research without development, *Made for Leavers* was anything but a rolling stone in March and I felt like Sisyphus pushing his boulder in Tartarus.

Now What?

In the future, I am going to make the most of the Easter break and prepare for a busy April, which is when the midpoint implementation, documentation, and video presentation is due on 28 April. "The struggle itself towards the heights is enough to fill a man's heart. One must imagine Sisyphus happy." French philosopher Albert Camus coined this quote that appropriately summarises March for me, despite limited actual progress on *Made for Leavers*, the effort I put in still makes me feel happy.

Student Signature

Panell Syll



(30) Days of April*Made for Leavers*5 May 2024

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: April

What?

Days 1-10, I finished my IT Governance, Security, and Ethics CA. I felt uneasy about this coming month because I knew that I would have three TABAs to complete, which would not allow me to work on *Made for Leavers* for the foreseeable future. Day 5, I emailed my supervisor with a change of plans with regards to *Made for Leavers*. After experimenting with ChatGPT, I realised that the Google Maps API and city information API were superfluous. I felt this way because ChatGPT was able to perform the functionalities that were planned for the Google Maps API and city information API. I felt relieved about this realisation because it enabled me to have a clearer vision of what *Made for Leavers* would look like in August.

Days 11-22, I completed my three TABAs. Days 11-13, I worked on my Penetration Testing TABA. Days 14-19, I worked on my Digital Forensics TABA. Days 20-22, I worked on my IT Governance, Security, and Ethics TABA. Afterwards, I felt over the moon that I finished the story in terms of completing my three TABAs. However, paradoxically, I felt disappointed that there was no time to work on *Made for Leavers* during this period excluding the meeting with my supervisor. Day 12, I met with my supervisor to discuss the contents of the email that I sent. I was happy that I received promising feedback and very happy to clarify what I was going to include in my midpoint implementation, documentation, and video presentation, which was postponed to 12 May.

Days 23-30, I watched Angular tutorials to refresh my memory. The YouTube channel of @TeddySmithDev was a very helpful instrument in this endeavour. I felt glad to be working on *Made for Leavers* because it had been a while since I was able to do so. I updated my final report to reflect the changes that I discussed with my supervisor. I felt pleased when I had updated my final report because it enabled me to acknowledge my decision, which will be confirmed on 12 May.

So What?

In the present, I feel proud of the one CA and three TABAs I submitted in April, additionally, I feel thankful that I can commit to working on *Made for Leavers* consistently. In terms of the midpoint implementation, documentation, and video presentation, I will produce a working protype of *Made for Leavers* that consists of 100% of the Hipo Labs API's functionality with an Angular front-end, a SQL Server database, and a C# back-end.

Now What?

In the future, I am going to work on *Made for Leavers* during May with dedication. I am going to continue watching Angular tutorials and complete *Made for Leavers*' prototype in time for 12 May. The documentation has already been completed in April, which means that I need to produce the implementation and video presentation in May. I feel excited to get to work.

Student Signature	Panell Syll
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(31) Days of May*Made for Leavers*2 June 2024

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: May

What?

Days 1-2, I worked on the documentation for *Made for Leavers*' midpoint examination. I felt glad about the progress I was making. However, I was unsure about what was required in certain sections of my final report, which I planned to talk to my supervisor about. Day 3, I met with my supervisor and discussed the different sections of the final report that I wanted further clarity on. As the submission was the midpoint examination, my supervisor specified that some sections would be started in the 12-May midpoint examination and would be finished in the 5-August final examination. I was pleased with the meeting as I felt reassured that I was on track for a 1st Class Honours midpoint examination submission.

Days 4-9, I did not do as much work as I would have liked as I was in Paris from day 6 and only got back a few hours before my meeting with my supervisor on day 10. Day 10, I met with my supervisor for my final meeting before the midpoint examination was due. The yomping consisted of me demoing fully *Made for Leavers*, revealing all. I was happy with the feedback I received and aimed to implement my supervisor's suggestion of making *Made for Leavers* automatically load the universities saved by a user within the Load page, without a button. Additionally, it was suggested to cater for interactions with recommended countries.

Days 11-12, I successfully made *Made for Leavers* automatically load the universities saved by a user within the Load page, without a button. After a confirmed great morning, I submitted my midpoint examination on Sunday night. I felt over the moon to have finished semester two and was looking forward to a bit of a break. Days 13-31, I mainly did research on how to integrate a ChatGPT-esque AI into *Made for Leavers*. I felt grateful for not being under pressure from a looming deadline, but I was not resting on my laurels while semester three was swimming to 5 August.

So What?

In the present, I feel proud of the midpoint examination I submitted in May, additionally, I feel grateful that Computing Project is my only module in semester three, which will enable me to dedicate a large amount of time to *Made for Leavers*. In terms of the final examination, I will stick to my project plan to ensure that I finish *Made for Leavers* by 5 August.

Now What?

In the future, I am going to work on *Made for Leavers* during June with passion. In June, my focus is to implement a ChatGPT-esque AI into *Made for Leavers* and finalise the CSS. If I finish that by the end of June, I will be in a great position to finish *Made for Leavers* by 5 August.

Student Signature	Panell Sylle



(30) Days of June*Made for Leavers*7 July 2024

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: June

What?

Days 1-20, I started implementing a ChatGPT-esque AI into *Made for Leavers* and started finalising the CSS. I highlighted these two aspects of *Made for Leavers* as what I wanted to complete by the end of June. I was pleased with the progress that I was making on these two aspects. However, I was impatiently waiting for my midpoint examination result. While I was still motivated to work on *Made for Leavers* during this time, I knew that getting positive feedback on my midpoint examination would give me extra motivation to work on my project.

Day 21, I received my result for my midpoint examination; 76.75 / 100.00. I felt joyous to have received 1st Class Honours for the midpoint examination as it emphasised that I was on the right road. "Good progress. Some key technologies and application components have been established with integration to the first external API now functional. The AI integration will be key for differentiating the project from static repositories of information." This feedback made me feel more motivated to implement a ChatGPT-esque AI into *Made for Leavers*.

Days 22-30, I finished implementing a ChatGPT-esque AI into *Made for Leavers* and finished finalising the CSS. For the AI, I embedded myninja.ai's Ninja AI into *Made for Leavers*. The reason I integrated the Ninja AI is because it would remain free and fulfils all the functionalities outlined in the final report. For the CSS, I removed the static look of the prototype and updated it with a modern green UI. I was happy that I successfully integrated the AI and updated the CSS as these two aspects were both important in terms of my final examination. Additionally, I created functionality to allow a user to click on a rotating recommending country to automatically search that country. The reason I added this is because it was recommended by my supervisor during my *Made for Leavers* demo. I felt proud of the progress I made in June.

So What?

In the present, I feel on top of the world to have received 1st Class Honours for *Made for Leavers*' midpoint examination. I put a lot of effort into my project over semester one and semester two and was glad that effort bore fruit. Additionally, I feel thankful that I was able to implement a ChatGPT-esque AI into *Made for Leavers* and finalise the CSS within June and without any major hiccups.

Now What?

In the future, I am going to continue working on *Made for Leavers* during July with passion. In July, my focus is to host *Made for Leavers* on Azure and establish a username-password system via Firebase. If I finish that by the end of July, I will be in a great position to finish *Made for Leavers* by 5 August.

Student Signature	Panell Syll



(31) Days of July*Made for Leavers*5 August 2024

Student Name	Daniel Syrén
Student Number	20105070
Course	BSCCYBE4
Supervisor	Michael Bradford

Month: July

What?

Days 1-7, I started implementing Azure hosting for *Made for Leavers*. This part of my project was challenging because Azure required a lot of different resources for it to work. I had to make a resource group called madeforleaversrg. I then created two resources for app service plans, one resource for the SQL database, two resources for app services, one resource for the API management service, and one resource for the SQL server. In total the *Made for Leavers* resource group consisted of seven resources. A particular challenge was finding an appropriate server to host the website as many options were not available on the free tier. Eventually, I tried North Europe, which worked appropriately. I felt relieved to have hosted *Made for Leavers* successfully as I knew that was 50% of what I wanted to complete on *Made for Leavers* in July, which was completed within the first week of July.

Days 8-14, I started implementing Firebase authentication for *Made for Leavers*. Firebase was a challenge in terms of linking the email and password form input on *Made for Leavers* and the database on Firebase. Once I successfully implemented this, I then had to update my SQL database to have an email field so I could link the saved universities to a particular email. I felt thrilled to have implemented authentication for *Made for Leavers* successfully as I knew that was 100% of what I wanted to complete on *Made for Leavers* in July, which was completed within the first half of July. Day 9, I emailed my supervisor for the last time. I was happy to have my supervisor take me under his wing this year.

Days 15-31, I continued working on the documentation for *Made for Leavers* and completed elements such as my project poster. Day 31, I recorded my final presentation. My final presentation's length was 27:34 and I was able to discuss everything I wanted to during this timeframe. I felt over the moon that my final presentation did justice to my *magnum opus*.
So What?

In the present, I feel a great sense of achievement. Looking at it on paper, returning to university to study Computing is a long, difficult road. However, this has not been my experience. When I think how lucky I am to wake up on the verge of having two degrees, I can't help but be amazed at how easy it all really was. This whole experience has made me understand the true meaning of silver linings.

Now What?

In the future, I pretty much just have to submit the project documentation, showcase poster, video presentation URL, and the code repository URL. 5 August is day 1413 of my journey at NCI and I am grateful for each one of them. My project is called *Made for Leavers* and now there is nothing else made for me but leaving.