Computer Science and Creative Technologies

Coursework or Assessment Specification

Module Details

Module Code	UFCFES-30-1
Module Title	Web Development and Databases
Module Leader	Zaheer Khan
Module Tutors	Zaheer Khan, Kamran Soomro, Barkha Javed, Shelan Jeawak, David Wyatt
Year	2020-21
Component/Element Number	A / CC1
Total number of assessments for this module	2 – please refer to module specification
Weighting	60%
Element Description	Website: Design and development of a Website

Dates

Date issued to students	8 February 2021
Submission Date	6 May 2021
Submission Place	Blackboard
Submission Time	14:00
Date to be returned to students	End June 2021
Submission Notes	All the group members will upload the final deliverables – see deliverables section - **individually** before the deadline. Failure to do so may be considered as non-submission by non-submitting group members.

Feedback

Feedback provision will be	Summative written feedback via blackboard. Formative verbal feedback during practical/seminar session;

Contents

Section 1: Overview of Assessment

In addition to generally supporting your learning on this module, this group work assesses the following module learning outcomes (taken from the module specification):

- *Demonstrate the ability to select and use web development techniques and concepts to develop dynamic and responsive websites (MO1)*
- *Identify and assess web security issues in a website (MO3)*
- *Demonstrate a basic understanding of legal, ethical, social and professional requirements when designing a web application (MO4)*
- *Design and develop data management solutions for a web application (MO5)*

The assessment is designed to allow you to use your learning and play to your strengths. You can get up to 80% marks by working individually. **To gain higher marks, you are expected to critically reflect through presentation and developing a small part of the website as a group.** For this you may form a group of up to **five (05) students**. You can make your own student groups and get it approved by your tutor. The objective is to work individually as well as in teams. This will help you to work in a collaborative software development environment. **Please note that you only need to work in groups for part II of the coursework (see Figure 1).** Group members will self-organise meetings. You should seek help of your tutors as early as possible and before deadlines if disputes or problems arise. You can always seek advice and/or interim verbal feedback from your tutors during practical sessions.

Each student is expected to submit part I of the website. Each group member is also expected to submit part II of the website. You should submit all source code (e.g. website project folder from htdocs folder or /var/www folder or flask app folder) plus relevant Database dump. You are also expected to provide a project presentation and project demo recorded video (i.e. screen recording with audio). In this video you'll talk through your Powerpoint slides to explain various aspects of your project and demonstrate functionality/features of your website by running the website in a web browser. **If needed, your tutors may schedule a group meeting for demo and ask questions about your project.** Please see deliverables section for more details.

As depicted in Figure 1, you are asked, **individually**, to select one (or more) travel options and then design and implement a travel booking web application for the selected option. Please record the learning from the development process including use of web technologies, application of legal, ethical, social, professional aspects (LESP), ensuring security and reliability through testing of the web application. With presentation and demo you can get up to 80% marks.

Then, to gain higher marks you are asked as a **group** to discuss how will you design and implement HTBS (Horizon Travel Booking Service) as a travel broker service. HTBS should integrate individual travel options your group members have implemented so that a user should be able to explore and assess various travel options before booking his tickets. There are many

broker service examples available online e.g., expedia.com or booking.com for flights/hotels; confused.com for car insurance; hotels.com for hotels etc. This part should get you up to 20% marks.

You'll be asked to present your work through a recorded presentation and project demo. Please be concise and provide examples in your presentation and project demo. Please be mindful of selecting appropriate working scenarios for the demonstration. The website developers may use any editor of their choice to write the code but you are not allowed to use web development tools such as WYSIWYG editors, without express permission of the module leader. You are allowed to use HTML, CSS, JavaScript, MySQL and Flask. All the Python programs must use version Python35 or above. **Please discuss with your tutors if you would like to use any other programming/scripting language or web framework.**

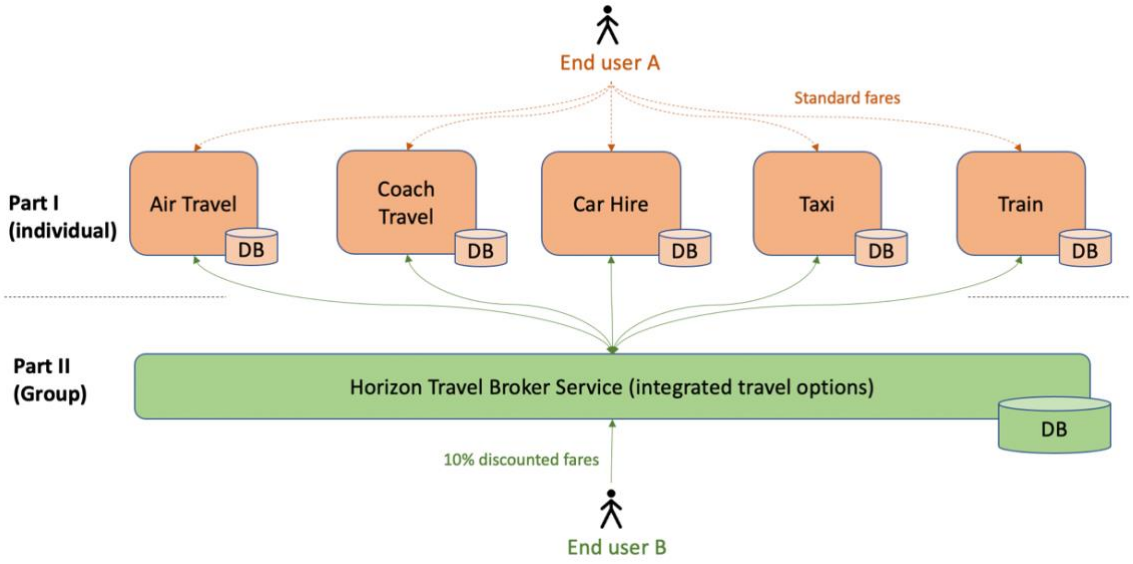

***Figure** 1: Case study – Horizon Travel Broker Service (HTBS)*

The software requirements for the assignment are described in more detail in **section 2**.
The assessment is worth **60%** of the overall mark for the module. **Each student must upload deliverables including code, DB dump, slides, test data, demo and presentation video by the submission deadline to claim any marks.**

Working on this assignment will help you to develop effective and systematic web development, web and data security, data management and programming skills. It will also help you to establish ways in which you can work as part of a group and to develop your writing, presentation and software demonstration skills. **Your tutor will organise one online session to answer your questions about project and this will be your opportunity to ask questions and clarify requirements**. **In addition, as part of your weekly practical sessions one exercise will be to discuss how the topic covered in the practical can be applied on your website project.** If you have more questions about this component, please post them to the discussion board on Blackboard. You can find the discussion board from the front page of the module Blackboard pages and use the forum under the title "**Group project**".

Section 2: Task Specification

The project consists of 2 parts.

Part I will be your individual work. To gain higher marks, Part II will be the work completed as a group. Please read the marking criteria carefully as there are marks for group activity as well as for individual work. It is expected that all group members will contribute equally to group part, though you should note in a typical group work this may not always be the case. All members of the group will get same marks for part 2[1]. For part 1 marks will be allocated based on work completed by individual members of the group.

Part I – Designing and Implementing a travel booking system (Individual part)

Each student selects one travel option and then designs and implements it. To make it easier, reference to travel option 'Air Travel' is used here. Other travel options have different price, routes and durations as depicted in Table 1 in Appendix-B. Students should adopt data from the Table 1 for their selected travel option. The main task is to design and implement the following functional individual requirements (IR):

IR 1: Lookup - request: User visits [Air Travel] enters basic travel data (e.g., departure/arrival city, date, time, number of seats (adult/children under 10), return/one-side journey etc.) and sends to server to find out seat availability and ticket prices on a specific date. [D, 10 Marks]

IR 2: Lookup – response: Website backend checks above user requirements e.g., flights on specific dates, seats availability and calculates prices (children under 10 year old have 50% discount on ticket price when accompanied by an adult) and displays various flight options for user to select and proceed with booking or restart the flight search. [D, 10 Marks]

IR 3: Booking process: Once user is satisfied with the flight details, the user can proceed with the booking process to book the tickets and make payment. The booking process should book the seats, generate receipt, update DB records as appropriate. Think creatively for booking process. [D, 10 Marks]

IR 4: User features: Website should provide various user features e.g.,

a. Login/logout, [D, 4 Marks]

b. cancelling booking. Cancellation fee is 50% of total booking cost and can be done 72 hours prior to departure [D, 2 Marks]

c. viewing booking details [D, 2 Marks]

d. updating booking details. Updates can be done 72 hours prior to departure [D, 2 Marks]

IR 5: Admin features: Website should provide suitable admin features e.g., admin login, reports, adding/amending flights etc. [D, 5 Marks]

Note: Indicative scenarios for the above IR1 to IR5 are presented in Appendix – D. You may use them for the implementation of your system.

[1] The rule that each group member will get the same mark will only be varied if every member of the group agrees in writing that the marks should be apportioned differently. This will be on the discretion of module tutors.

In addition, there are following Non Functional Requirements (NFR)
IR 6: Responsive design and look & feel: Website should be responsive and have good look and feel [D, 10 Marks]
IR 7: Database design: Database design should be in 3NF [2S, 5 Marks]
IR 8: LESP: Website should cover associated LESP issues [1S, 5 Marks]
IR 9: Security: Website and underlying database should be secure [D, 5 Marks]
IR 10: Evaluation: Evaluate your website using testing and other techniques [1S, 5 Marks]

Note: Each requirement indicates how will it be assessed and maximum marks E.g., IR1 [D, 10 Marks] indicates that IR1 will be assessed through project demonstration and it has 10 marks, IR7 [2S, 5 Marks] indicates that it will be assessed through Powerpoint slide presentation and students should use up to 2 slides. All slides should include suitable examples. Demo should be properly planned with sample/test data to demonstrate full strength of implemented features.

Part II – Design, reflection and implementation of HTBS integration

This part comprises of following group requirements (GR):
GR1: HTBS Integrated Front-End: All individual travel options are integrated (e.g. one main webpage for extracting travel details from all travel options) – think creatively.

GR2: HTBS Integrated Back-End Process: The HTBS website should show results of alternative travel options including availability and booking cost (with 10% discount) on selected dates and routes. This will enable end user to decide which travel option is appropriate to book. The end user should be able to select one of the resulting options and then may proceed with booking process – think creatively.

Note: Indicative scenarios for the above group requirements are presented in Appendix – D. You may use them for the implementation of your system.

Tasks:
Task 1: Discuss with your group members and then explain in your Powerpoint presentation that how would you plan and integrate different travel options to fulfil part II group requirements. You may consider:

- Explain what will be your plan to work as a team? Here, you may consider: how will you start group work and divide responsibilities? What problems could you face? and how will you resolve group conflicts? How will you handle code sharing, integration and testing?
- Explain how your group will implement HTBS software for fulfilling each group requirement?

Please note that each student has to add the above explanation in his or her individual presentation. This explanation can be same for all group members. **[2S, 10 marks]**

Task 2: To gain more marks, implement group requirements and show HTBS features in your project demo. **[D, 10 marks]**

Demo and presentation
There are also **[5 marks]** allocated to quality of presentation and demo. This will include wise use of the allocated time and use of good quality and relevant examples for slides presentation and project demo.

NOTE:

1. You are NOT required to provide a payment mechanism for your website, though you may simulate this. Hint: Think about PayPal payment buttons.
2. Your tutors will act as end users and you can clarify requirements by posting queries on the Discussion Forum. But before you do so you should look at the Appendix D where indicated fine details for different Part I and Part II requirements are provided.

Section 3: Deliverables

You must use the Blackboard electronic submission system to submit your work. Each student will have to upload complete package individually. Electronically submitted deliverables include:

1. An individual web system for part 1 (and part II if implemented), with source code in ZIP file (using e.g., 7Zip). This should contain all the files and folders for the full working website. All programme files must have group ID/name and student name and student ID who has written the code.
2. Relevant Database (e.g. MySQL or MongoDB) dump.
3. A presentation in MS PowerPoint (if you are working in Linux these slides can be in PDF format).
4. Create and submit a project presentation and demonstration video (**up to 8 minutes maximum**) showing working features of your web site and presenting your slides. You may choose any software for creating video e.g., OBS, Kaltura, Screencast-o-matic, etc. Use your video time wisely.

You should compress all above into one zip file and will submit via Blackboard submission system. The naming standard of the zip file is WP1234567.zip where 1234567 is the student Id.

Section 4: Marks Distribution and Marking Criteria

In common with all UWE standard undergraduate assignments, the pass mark for this assignment is 40%. The detailed marking criteria for this portfolio is detailed in Appendix-A.

Part 1 – Designing and Implementing a travel booking system – 75%.

Part 2 – Design, reflection and implementation of HTBS integration – 20%

Each student will prepare a project demo and slides presentation recording (for part I and part II) and there are **5% marks** allocated to quality of presentation and demo (recording and/or real presentation/demo). This will include wise use of the allocated time and use of good quality and relevant examples for slides presentation and project demo. – **5%**

After the formal completion of this work, and given that you have included the demonstration & presentation video, **you will not be required to attend the final tutor review sessions**. **However if needed, your tutors may schedule an online group meeting for demo and presentation and ask questions about your project.** You should carefully look at the marking criteria to see how marks will be awarded to different elements of the work.

More information on the peer/tutor review will be available nearer the time.

Every student who is part of a group undertaking an assignment or other piece of assessed group work is required to take, and will be deemed to have taken, individual as well as joint responsibility for all the work submitted by the group. In particular, this includes individual as well as group responsibility for any assessment offence (e.g., Plagiarism) committed, whether by the student or any other student in the group.

Section 5: Feedback mechanisms

Detailed summative written feedback will be provided via blackboard.
There will be opportunity for you to get formative interim verbal feedbacks during teaching or practical sessions;

Appendix A. Marking Criteria

Part 1: *Designing and Implementing a travel booking system*	**0-3**	**4-5**	**6-8**	**9-10**	**Mark & Advice for Improvement**
IR 1 (D, 10) Lookup - request	Little or no implementation; errors on the page;	Partially functional; static pages; data is hardcoded; role of technologies is not fully clear; basic demo to show implemented functionality	Fully functional and error free; role of technologies was clear; dynamic webpages with data from database; but demonstration was not well planned	Fully functional and error free; insightful thinking for designing and implementation; role of technologies used was clear; dynamic webpages and data from database; demonstration was well planned with suitable examples	
IR 2 (D, 10) Lookup - response	Little or no implementation; No response or erroneous response received; Response misses the required information	Partially functional; required data is processed and presented on the webpage but with flawed design, e.g., using JS; prices are not fully correct; basic demo to show the implemented functionality	Fully functional and error free; all required data is received and interactable; demonstrates good integration of client and server-side scripting and data storage; but demonstration was not well planned	Fully functional and error free; insightful thinking for designing and implementation; demonstrates good integration of client and server-side scripting and data storage; demonstration was well planned with suitable examples	
IR 3 (D, 10) Booking process	Little or no implementation; Errors on the page; Misses most of the information on the webpage	Partially functional; booking process initiates but does not show all the information;	Fully functional and error free; booking process is reasonable and does not miss necessary data; demonstrates good integration of client and server-side scripting and data storage; records are correctly updated in the database e.g., seating capacity, booking id, etc. but demonstration was not well planned	Fully functional and error free; insightful thinking for booking process demonstrating client-server scripting and correct/complete data storage; end user is kept well-informed with booking details i.e. screen messages; demonstration was well planned with suitable examples	
IR 4 (D, 10) User features	little or no user features; errors on the pages; users are unable to do much after booking	Partially functional i.e. at least one user feature is implemented e.g., user login implemented or viewing bookings implemented; there are some other features implemented but they have errors;	At least three user features implemented with reasonable design and these are error free; e.g., login, cancelling booking with cancellation fee, viewing booking, etc. but demonstration was not well planned.	Fully functional and error free; insightful thinking for user features demonstrating client-server scripting and correct/complete data storage; good number of user features implemented e.g., changing user account password; demonstration was well planned with suitable examples	

IR 5 (D, 5) Admin features	Partial or no admin user features; admin can login and can do little things like change fare;	Fully functional and error free; reasonable admin features including at least one admin report or modify flight details or add new routes etc. Reasonable demonstration.			
IR 6 (D, 10) Responsive Design and Look & Feel	No or little responsive design	Partially responsive design; Viewable on two different screen sizes and very basic look & feel of the website	Fully responsive design; mobile-first approach; viewable on at least three different screen sizes and reasonable look and feel of the website	Fully responsive design; Insightful thinking for designing the mobile-first design; and very nice and intuitive front end - look and feel of the website	
IR 7 (S, 5) Database Design	No DB design or DB design is shown is not fully in 3NF (e.g., at least 1NF or up to 2NF)	DB design shown and is in 3NF and well explained			
IR 8 (S, 5) LESP	No LESP or some aspects of LESP and their application in the project is covered but explanation missed reasonable project examples	Reasonable LESP issues covered in the project and well explained with good examples from the project.			
IR 9 (D, 5) Security	Little or some implementation of web and database security concepts e.g., user logins, SQL injections, hashing, etc.	Reasonable implementation of web and database security concepts e.g., SQL injections, hashing and authorization token was well demonstrated			
IR 10 (S, 5) Evaluation (Testing)	No testing or some testing is performed; testing strategy applied is explained with project examples	Brief reflection on the evaluation is provided i.e. whether or not the objectives of the project achieved and how well are they achieved?			
Part 2: *Design, reflection and implementation of HTBS integration*	**0-3**	**4-5**	**6-8**	**9-10**	**Mark & Advice for Improvement**

Task 1 (S, 10) Explanation of integration process for GR1 and GR2	No or limited explanation on the integration; No or limited explanation on the group work	Reasonable explanation for group work explained with suitable examples	Reasonable implementation design for HTBS was explained with suitable examples	Insightful thinking for both group work and HTBS design for implementation; the HTBS design looks reasonable and can be implemented. Good examples are used to explain both aspects.	
Task 2 (D, 10) Implementation of GR1 and GR2	No or very little implementation e.g., Hyperlinking travel options from HTBS site and this means most of the required features are missing	Partial implementation of GR1 with all data is dynamically loaded	Fully functional and error free implementation of GR1; Partial implementation of GR2 with some data passed/received between HTBS and travel options endpoints and demonstrated	Fully functional and error free implementation of GR1 and GR2; Implementation conforms to the design in task 1; Demonstration is well planned.	
Quality of Demo and Presentation (5)	**0-3** Lacks coherence of arguments; several English spelling and grammatical mistakes on slides; Text is less legible; quality of diagrams is often poor; lacks good quality of examples	**4-5** Well planned presentation, with reasonable contents, and project demo with reasonable test data/scenario; Good use of allocated time; Good quality examples used.			

Appendix B. Travel Options and rules

As an example, the timetable for Air travel is as follows:

Leave	At	Arrive	At
Newcastle	16:45	Bristol	18:00
Bristol	08:00	Newcastle	09:15
Cardiff	06:00	Edinburgh	07:30
Bristol	11:30	Manchester	12:30
Manchester	12:20	Bristol	13:20
Bristol	07:40	London	08:20
London	11:00	Manchester	12:20
Manchester	12:20	Glasgow	13:30
Bristol	07:40	Glasgow	08:45
Glasgow	14:30	Newcastle	15:45
Newcastle	16:15	Manchester	17:05
Manchester	18:25	Bristol	19:30
Bristol	06:20	Manchester	07:20
Portsmouth	12:00	Dundee	14:00
Dundee	10:00	Portsmouth	12:00
Edinburgh	18:30	Cardiff	20:00
Southampton	12:00	Manchester	13:30
Manchester	19:00	Southampton	20:30
Birmingham	16:00	Newcastle	17:30
Newcastle	06:00	Birmingham	07:30
Aberdeen	07:00	Portsmouth	09:00

Also, Air travel uses a fixed fare for each journey. Fares are:

Dundee-Portsmouth (or v.v.)	£90
Bristol-Manchester (or v.v.)	£50
Bristol-Newcastle (or v.v.)	£70
Bristol-Glasgow (or v.v.)	£80
Bristol-London (or v.v.)	£50
Manchester-Southampton	£50
Cardiff-Edinburgh	£60
All other routes are charged at:	£65

Each flight can accommodate maximum 100 passengers.

For other travel options, the above tables should be adapted as per following rules:

- Maximum number of bookable seats for Coach = 45, Air = 100, Train = 200, Taxi = 4 per taxi.
- Taxi travel fares are £1 per mile as standard charge. Per mile rate will be 25% higher for 2-3 passengers. And, per mile rate will be 30% higher if there are 4 passengers. You may take distances between different destination from google map or make assumptions.
- Coach fares are 1/4th of Air travel fares per passenger.
- Train fares are 2 times of Air travel fares per passenger.
- Air travel option travels to all destinations. Coach does not travel to Dundee and Aberdeen. Train does not travel to Dundee and Cardiff. Taxi travels to all destinations.

- Journey time from one travel mode to another varies i.e. Coach is 9 times more journey time than Air; Train is 5 times more than Air; and, Taxi is 7 times more than Air.
- Standard car hire option has same rules as taxi but it also operates executive cars. Executive car option has double fare.
- Air and Car Hire journeys operate Monday to Saturday only. Coach and Train operate Sunday to Fridays only. Taxi journeys are all days of the week.

Appendix C. Tentative Milestones

Week 1: Coursework is released and you have read and understood your project brief
Week 2: You have clarified any questions with your tutors and have started planning your coursework.
Week 3: You have started to design front end e.g., sitemap, static pages, CSS style rules, media queries
Week 4: You have started to design database model
Week 5: You have completed data model and SQL queries written which can then be used in python script
Week 6: You have started to think about designing server-side end points i.e. forms, data transfer, processing
Week 7: You have started to implement your server side script using Flask; You also have started to think about part II.
Week 8: You have completed the core Part I functionality and have started to think about client-side scripting
Week 9: You have started to put together your slides and also have started to implement security aspects
Week 10: Your Part I is complete and you have started to work on Part II
Week 11: Your website is complete, tested and ready to be submitted with all deliverables.

Tip: Though it is not compulsory you should consider forming group as early as possible. If you leave it late you may not be able to form/join a group!

Appendix D. Indicative scenario details for different Part I and Part II requirements

This appendix presents indicative scenarios showing flow of activities for different requirements. You may adapt these scenarios or come up with your own scenarios.

- **IR 1: User visits [Air Travel] enters basic travel data (e.g., departure/arrival city, date, time, number of seats, return/one-side journey etc.) and sends to server to find out seat availability and ticket prices on a specific date.**
    - Selects from and to cities - these cities are dynamically loaded from the underlying database
    - Enters departure and return date (only if it is return flight booking)
    - Enters number of passengers
    - Specifies number of adults and children i.e. under 10 year old;
        - Ensuring children are accompanied by an adult
        - Children under 10 year old have 50% discount on ticket price
    - Sends above data to server to check flight and seat availability and get ticket price (i.e. IR2)

- **IR 2: Website backend checks above user requirements e.g., flights on specific dates, seats availability and calculates prices and displays various flight options for user to select and proceed with booking or restart flight search:**
    - lists all available flights for entered dates and also shows departure and arrival times of those flights

- Shows total booking price and also offers user to show price breakdown (e.g., individual ticket price, child discount, taxes etc.)
- Offers to select one of the departure (and return flights if return flight booking was selected in IR1)
- Sends above selected offer to get summary of booking i.e., flight details, number of tickets and prices (i.e. IR3).

- **IR 3: Once user is satisfied with the flight details, the user can proceed with the booking process to book the tickets and make payment:**
  - Systems asks user to login to an existing account or create a new one (if not an existing user) – see IR 4.
  - Asks user to enter passenger details e.g., name, address, passport number
  - Ask for payment method and details e.g., credit/debit card
  - Proceed with booking
    - Generates a unique booking reference or ID
    - Updates flights seating capacity
    - Creates a timestamp (i.e., date and time when transaction took place) for the booking
    - Collects payment using the payment method
    - Displays booking confirmation message (or failure message if booking didn't go through) with booking id, flight, passenger and payment details.
    - Generates a downloadable receipt
    - Sends a confirmation email with above details to customer's email address.

- **IR 4: Website should provide various user features e.g., login, cancelling booking, viewing booking details etc.:**
  - IR 4a: User is able to login to his account
  - IR 4b: User is able to cancel his booking 72 hours prior to the departure. Cancellation fee is 50% of total booking cost.
  - IR 4c: User is able to amend booking details 72 hours prior to departure
  - IR 4d: User is able to see all his previous bookings after login to his account
  - IR 4e: User is able to change user password

- **IR 5: Website should provide various admin features e.g., admin login, reports, adding/amending flights etc.:**
  - IR 5a: System admin is able to login to his account
  - IR 5b: Only system admin is able to generate various reports e.g.,
    - list all bookings between two dates,
    - list all passengers on a specific flight
  - IR 5b. Only system admin is able to modify flight details e.g., increase/decrease ticket price, changing departure time/date, adding more seats
  - IR 5c. Only system admin is able to add new routes (i.e. destinations) and flights
  - IR 5d. Only system admin is able to cancel a flight or delete a flight.

- **GR1 and GR2: HTBS Integrated Front-End and Back-end …**

- GR 1 & GR2: All travel options are integrated i.e. when a user enters basic travel data (e.g., departure/arrival city, date, time, number of seats, return/one-side journey etc.) and sends to the broker service, the broker services returns seat availability and ticket prices on a specific date from all integrated travel options.