COMP1429 (2021)	Systems Modelling	Contribution: 100% of course
Course Leader: Dr Joseph Osunde	Group & Individual Task	Deadline Date: Friday 02/04/2021

Plagiarism is presenting somebody else's work as your own. It includes copying information directly from the Web or books without referencing the material; submitting joint coursework as an individual effort; copying another student's coursework; stealing coursework from another student and submitting it as your own work. Suspected plagiarism will be investigated and if found to have occurred will be dealt with according to the procedures set down by the University. Please see your student handbook for further details of what is / is not plagiarism.

All material copied or amended from any source (e.g. internet, books) must be referenced correctly according to the reference style you are using.

Your work will be submitted for plagiarism checking. Any attempt to bypass our plagiarism detection systems will be treated as a severe Assessment Offence.

Coursework Submission Requirements

- An electronic copy of your work for this coursework must be fully uploaded on the Deadline Date of Wednesday 31/03/2021 using the link on the coursework Moodle page for COMP1429.
- For this coursework, you must submit a single PDF document. In general, any text in the document must not be an image (i.e. must not be scanned) and would normally be generated from other documents (e.g. MS Office using "Save As ... PDF"). An exception to this is handwritten mathematical notation, but when scanning do ensure the file size is not excessive.
- There are limits on the file size (see the relevant course Moodle page).
- Make sure that any files you upload are virus-free and not protected by a password or corrupted otherwise they will be treated as null submissions.
- Your work will not be printed in colour. Please ensure that any pages with colour are acceptable when printed in Black and White.
- You must NOT submit a paper copy of this coursework.
- All coursework must be submitted as above. Under no circumstances can they be accepted by academic staff.

The University website has details of the current Coursework Regulations, including details of penalties for late submission, procedures for Extenuating Circumstances, and penalties for Assessment Offences. See http://www2.gre.ac.uk/current-students/regs

DETAILED SPECIFICATION

Important Notes:

This is a **Group Coursework with an individual component as discussed in the deliverables section**. A Group consists of FOUR or FIVE people.

Each student should individually submit <u>ONE</u> report with two sections. Section 1 will include **Deliverable 1 which is the group work** and Section 2 will include **Deliverable 2 which is the individual component**. The title page of the report should contain the names and IDs of all students in the group. Section 2 should include the name of the student who has completed the individual component.

The pro-forma indicating individual contributions to the work needs to be approved, accepted and signed by all members and all coursework uploads from a group need to include the same pro-forma.

Case Study: CoachTravelling online system

CoachTravelling is a medium-size travel by coach company based in the UK that organises small luxury group tour programmes (around 40 people per group) in Europe. They offer a wide selection of coach holidays and short breaks to hundreds of world-renowned destinations across Britain, Ireland and mainland Europe. At the moment customers can locate the company by recommendations from others, advertisements in the local newspapers, leaflets provided at hotels, or by visiting the company in person. Whilst the company has broadened its scope in terms of types of tours and destinations, its customer base still consists of people approaching retirement or already retired (ages ranging from 60-75).

This is an excerpt from the company's policy:

Inclusive Itineraries. Virtually all short breaks and holidays include a detailed programme of exciting excursions and days out, all carefully planned to add to your holiday enjoyment.

Style, Comfort & Safety! Every holiday feature travel in style and comfort, with all coaches offering individual reclining seats with seat belts for your safety. All holidays also offer the reassurance of on-board toilet facilities and also full air conditioning for your added comfort.

Sparkling Entertainment! Many holidays also feature a programme of colourful evening entertainment for your enjoyment.

Reserved Seating. At the time of booking most holidays offer the option of reserving your seat.

Local Departure Points. On most of our holidays you can join your holiday coach from your local departure point and relax from the very start.

Assistance with your Special Needs. In order to ensure your total enjoyment of your holiday, our staff will be pleased to advise and assist with any special requests, however large or small.

The company has a customer relationship management system (CRM) in place, which allows Sales Staff to manage the planning and scheduling of holidays, however, is unable to cope with the increasing numbers of customers and bookings. At present, most orders arrive by phone, or in person. The call centre is used to field customer calls, process orders and queries. Bookings are taken by sales staff who receive requests for information on trips planned and on availability for a specific trip. They may also suggest alternative holiday trips based on specific preferences provided by the customer (e.g., beach trips, mountain trips etc.). Reservations are taken on trust. Payment can be made in advance or on arrival at the coach for departure. If this is the first time that a customer has requested a booking, then a customer record is set up by the Sales Staff. Customer lists are compiled from previous bookings and are used for regular advertising mail-shots.

Although the company has stable growth in the last few years, increased competition and a need to increase their market share as well as their customer base has let the Board of Directors of the company to think about other ways of providing their services. In order to remain competitive and provide a richer and faster customer experience, CoachTravelling are now thinking, rather late in the day, of breaking into the market for booking holidays online and also to proceed with the creation of a mobile application for the recent operating systems such as (Android 9.0 "Pie".). The mobile application would allow customers, among others to view and amend their bookings, access real time assistance and also pay in real-time. Executives hope that this will help ease sales staff and allow them to focus on additional customer queries.

The new online system is seen as critical for growing client base and the CIO of the company, Mark Johnson, firmly backs the new system, and believes that it will provide an ideal opportunity for the company to 'push' sales by profiling customers and offering special deals. Furthermore, the improved customer information that will be gathered in the new system will allow greater analysis to be performed within all departments of the company, and is seen to be a key differentiating factor of CoachTravelling. The Board of directors believe that the key to increased market share is having both pure online and hybrid telephone ordering capabilities as well as reach into the market of mobile applications by recognising the need to *"go out and find customers and not wait for them to come to us"*, especially interested in targeting younger adults and young families.

Mark Johnson, the CIO, has indeed many times highlighted the company's vision which is to provide:

Best service: delivering outstanding service to our customers through our stores, in our call centres, online and through our mob app.

Customer trust and relevance: providing a personalised experience for our customers: from the services we offer to the way we sell them.

You are consultants, called to assist *CoachTravelling,* with the development of their online system and their mobile app. The online system should manage the planning and scheduling of trips by sales staff and the manager, customer distribution lists and circulars and customer booking and payments. They have a tight deadline of 6

months for the system to go live, staff should be trained within 3 weeks and the analysis, design and development of the new system should be within the budget of 70.000 pounds as decided by the Board of Directors.

Below is a description outlining the functionality the new online system and the mobile app will possess:

1) Allow customers to browse and search the list for coach trips of interest. They should be able to specify start and return dates, location and departure station.

2) Customers can choose from a number of trip deals, such as WeeklyTrips and FamilyTrips, or they can customise their trip.

3) Customers should be given the option to provide their seat preference. These are for:
   a. Window seats
   b. Customers specifying adjoining seats
   c. Aisle seats

   Aisle seats however are given a 15% discount.

4) Allow customers to make a general enquiry or an enquiry about a specific trip by using the real time AI assistance chatbox. If their enquiry is not resolved, then this will be forwarded to a Sales staff.

5) An order can be placed either online, through the mobile app, in person or through phoning the Sales department. If an order is made via the mobile app, the customer will have to first register by creating an account with their personal details (thus creating a profile containing all relevant information to the customer, such as name, email, address and credit card details) and then choose their trip or deal via a menu that appears on-screen. The order is processed electronically. As a promotional offer, ordering via the mobile app, will be given an automatic 10% discount. Furthermore, an additional discount of 15% will be given to students.

6) If the customer places an order online, they need to follow the registration process as described above and they should be then able to proceed with their order by using the conventional electronic "shopping basket" and "check out" functionalities. Online orders are given an automatic 10% promotional discount as well.

7) If a customer phones the Sales department to place an order, then the Sales Staff will have to follow a verification process to attempt to identify the person calling, even if they are new, and will then be able to bring up an existing customer account or create a new account for new customers.

8) The system should allow Sales Staff to access all trips in order to inform the customer accurately about prices and products and also allow them to deal with any enquiries and bookings.

9) The system must provide an easy way for customers or sales staff to cancel or amend a booking 24 hours prior to the intended journey.

10) The system should also be able to check whether the trips selected by customers are available, whether the seats selected are available, calculate the total, process a payment and verify card details.

11) The only means of payment permitted is credit card. The checking of credit card details will be done by the company's bank, through a link to a system known as *VISACheck*. After the payment is finalised, the system

should be able to produce an on-line ticket for customers to print which should indicate the details of their journey, their seat number and the final cost.

12) Based on the customers' profiles, built up over time, the system should be able to send recommendations regarding specific trips, or special offers. Customers should be able to use their special offers in their next purchase by entering the special offer code.

13) Sales Staff on their end should interact with the customers through the system by sending emails or by replying to their queries. Among the actions that the Sales staff might take are: creating customer accounts, adding new trip destinations, creating trip deals, make recommendations to customers based on the previous order history of the customer and placing an order.

14) The cost of each trip is determined individually by the manager and then inserted in the system by Sales staff. The manager also creates the week's schedule usually three weeks in advance.

15) The company owns a number of coaches of variable capacity. Each coach has numbered seats and seats may be booked by number. Occasionally it is necessary for the manager to assign a different coach to a trip for reasons of coach capacity or coach breakdown. In this case the system must issue new tickets for customers, which will be forwarded to customers through email by sales staff. An algorithm is required, however, which will attempt to preserve expressed customer preferences, for window seats, adjoining seats and aisle seats in the case of allocation of a new coach to a trip.

16) After the completion of their trip, customers should be able to use the online system and/or the mobile app to leave their review and star rating for their trip or deal, the coach with which they travelled and the customer support they were provided with throughout their journey.

The company's president, Mr Soul backs the new system, and believes that the new online system and the mobile app will cut costs significantly and provide a better way to cope with rapid growth and increase revenue particularly through profiling and special offers. He believes that this new system will improve existing customer satisfaction, which is his number one priority.

The Sales Director of the company, Mr Ronan, however, has a slightly different vision about the new system. He sees this as the first step in the development of an interactive web-based system that would allow customers to read honest reviews about the different trips and destinations, something similar to TripAdvisor. He believes that the mobile application would allow them to reach out to new customers and attract the younger generation; however the family oriented view of the company should still prevail.

Sales Staff on the other hand are not very excited with the decision to move online or with the development of the mobile app. They feel that dealing with customers in person is much better and as they state *"this personal interaction is what makes customers coming back"*. They believe that their friendly and welcoming approach as well as their ability to customize deals for customers is irreplaceable. In addition, they still express concerns about losing their job as they believe that the new systems will replace many of their responsibilities.

Deliverables:

Undertaken by the group and submitted for credit

You are required to produce a report documenting the requirements analysis and initial design of the *CoachTravelling* online system. Groups are expected to use CASE tools to create their UML diagrams. You are encouraged to use any of the CASE tools introduced in this course, however this is not an absolute requirement and you can use any available UML CASE tool. The work must establish the key design aspects of the proposed system.

We require <u>only ONE report</u> for this coursework, which will be split into TWO sections. Section 1 will include Deliverable 1, while section 2 will include Deliverable 2.

Deliverable 1: GROUP work (70% of coursework)

A final group report **(aprox 4000 words)** which must include the following:

a) A Rich Picture serving as an initial exploration of the problems, primary issues, key stakeholders etc; Please state any assumptions you might had to make throughout this process.
b) A Root Definition to be used as a starting point for the proposed design and CATWOE; Note that the emphasis should be on the information system, and the root definition developed should express an activity/transformation that will be substantially achieved or enabled through software.
c) Discuss which systems development process/methodology your team would use when undertaking the development of the new system and why.
d) Two Detailed Use Case diagrams (use <<include>> and <<extend>> where appropriate) from the perspective of two of your main actors (e.g., Customers and Staff). You need to create the scenarios for 2 of your main use cases. (1 use case from every use case diagram).
e) A Conceptual Class Diagram demonstrating the main classes with their attributes, methods and associations (aggregation/composition and generalisation where appropriate).
f) One Object Sequence diagram for one of the main Use Case within your use case diagrams. Remember to use one of the use case scenario created above in order to help you construct your Object sequence diagram.
g) Two State Chart diagrams for two of your main classes.
h) One aspect of systems development is capitalising on the requirements in order to propose additional beneficial features.
   1. Suggest additional capabilities which could be added to the system to improve the CoachTravelling business.

Your report also needs to include:

1) A title page with the name of your group, the names and IDs of students involved.
2) Table of contents with appropriate sections and Page numbering.
3) Please complete the pro-forma below, indicating individual participation and contributions and submit this together with your report. The pro-forma needs to be agreed and signed by all members of the group.

Please remember that large diagrams are best reproduced on a separate page. You must ensure that the diagrams are readable! Remember that this coursework is an opportunity to show what you have learned throughout this semester of this course. Please feel free to structure your report in such a way which reflects this. You could include information which is not in the required list above in order to support your argument.

Pro-forma

In percentage, please indicate the work contribution of each member. This should be agreed by all group members.

The total of all members' work must add up to 100%

You must submit this form in the final report. Put your initials in the signature columns. This copy must be signed by all members.

Group/Team Name:_____

Team member name	Student ID	Individual overall work contribution (%)	Additional notes on task description	Signature
Student:				
Student:				
Student:				
Student:				
Student:				
Student:				
Total 100%				

Grading Criteria

Your work will be assessed for the quality of the report you will produce.

In general, the marks for the group component are awarded as follows:

1) Correct use of the first three stages of the Soft systems methodology.
2) Correct use of UML notation.
3) Suitability and consistency between the UML models (This include selecting suitable aspects to model for each of the diagram types).
4) Coherence between the proposed system, as expressed in the root definition, with the UML diagrams.
5) Sophistication and novelty of the extra functionalities' students will propose and recommendations for moving to the Cloud.
6) Demonstration of independent thinking. As self-directed learners you are expected to choose and justify a suitable systems development approach and use appropriate UML tools for modelling.
7) Presentation, structure and coherence of the report.
8) Group dynamics with effective interaction and team cooperation and/or management.

Individual student marks may be adjusted according to the pro-forma you will have to complete as a group and attach to your report.

In general, the marks for the individual component are awarded as follows:

1) Sophistication of answers produced and critical reflection/review of the literature.
2) Based on the number of sub-questions addressed.

Assessment Criteria – Marking Rubric

Typically marks will be awarded as follows:

80-100 Exceptional	▪ Demonstrates exceptional knowledge and critical understanding of the underlying concepts and principles associated with the area of study. ▪ Exceptional coverage of assessment criteria and extensive range and consistent accuracy of information and knowledge. ▪ Mastery of relevant methods and techniques. ▪ Produce of an exceptionally coherent and well-structured assessment which effectively communicates information, arguments and analysis in a variety of forms and deploys key techniques of the discipline effectively. ▪ Fluent argument demonstrating great independent thinking or critical insight. ▪ Outstanding use of clear, accurate English, exceptionally well organised, with flow and progression. ▪ Outstanding and effective group dynamics. ▪ Exceptional answers produced for the exam type questions with an excellent critical discussion
75- 79 Excellent	▪ Excellent and thorough understanding of the subject. ▪ Excellent coverage of assessment criteria with a thorough range and consistent accuracy of information and knowledge. ▪ Excellent understanding of relevant methods and techniques (e.g. UML modelling and SSM techniques). ▪ Extensive range and consistent accuracy of information and knowledge. ▪ Fluent argument demonstrating independent thinking or critical insight. ▪ Excellent presentation, structure and standard of English. ▪ Excellent group dynamics. ▪ Excellent answers produced for the exam type questions with an excellent critical discussion
70-74 Very Good	▪ A clear understanding of the subject and underlying concepts and principles. ▪ Competent application of relevant models and techniques (e.g. UML modelling and SSM techniques). ▪ Wide and accurate range of information and knowledge deployed. ▪ Clear argument which may demonstrate a degree of independent thinking or critical insight. ▪ High quality of presentation, structure and standard of English ▪ Very good group dynamics. ▪ Very good answers produced for the exam type questions with a very good critical discussion
60-69 Good	▪ A sound understanding of the subject and underlying concepts and principles. ▪ Knowledge and some application of relevant models and techniques (e.g. UML modelling and SSM techniques). ▪ A standard and largely accurate range of information and knowledge. ▪ May rely more on knowledge rather than on argument. ▪ Satisfactory quality of presentation, structure and standard of English. ▪ Good group dynamics with some issues. ▪ Satisfactory answers produced for the exam type questions with an element of critical discussion
50-60 Satisfactory	▪ Basic knowledge and understanding of the underlying concepts and principles associated with the area of study. ▪ An adequate coverage of assessment criteria with limited range of information and knowledge deployed. ▪ Some knowledge and simplistic application of relevant models and techniques (e.g. UML modelling and SSM techniques).

		▪ A familiar or limited range of information and knowledge deployed, with some areas of inaccuracy. ▪ Argument and analysis may not be fully developed. ▪ Acceptable quality of presentation, structure and standard of English. ▪ Group dynamics problematic with areas of concern. ▪ Basic answers produced for the exam type questions with little critical discussion
0-49	Fail	▪ Unacceptable standard. ▪ Lacking of basic understanding of the subject. ▪ Insufficient or inaccurate knowledge of the subject, its models and techniques (e.g. UML modelling and SSM techniques). ▪ Inability to develop a reasoned argument. ▪ Unacceptable quality of presentation, structure and standard of English. ▪ Poor group dynamics with a range of issues. ▪ Unacceptable answers produced to the exam type questions