UFCFK6-30-2: Software Engineering Module

Assignment Specifications: Coursework I, II & III

1st November 2017 – 12th April 2018

**I. The Method:**

This assignment is a group-work project. Ideally, you are required to be in a group of four-five students, and you will need to consult your tutor as soon as possible, if you have any difficulty in forming (or being in) such a group. And, subject to approval by your tutor, the minimum number of members in a group cannot be less than four and not more than six. **Please note that all group members should be officially timetabled for the same practical session as per the instructions given to you during the first and subsequent lectures in addition to practical sessions.**

Furthermore, you will need to be in the same group that you sign up with when you started the project and for the whole life-cycle of this project. Group leadership is rotational as per key milestones in the project (or as you may prefer it to be upon agreement with your tutor). The individual mark of each member in the group is the sum of the following elements, and the individual’s mark in the group-work is **fully dependent on his/her contribution to the achievement of group-work and his/her individual deliverables.**

1. Project proposal (1st group-work results): **this constitutes 15% of the total assignment mark and is explained in section II, deadline: Thursday, December 7, 2017, 14.00h. (COURSEWORK I) (4 weeks)**
2. Final group-work results: **this constitutes 65% (COURSEWORK II deadline: Thursday, April 12, 2018, 14.00h) of the total assignment mark which include as well the individual’s contribution to pre-set tasks as explained in section III.** Group members will need to submit the following: **(8 weeks)**
   1. Updated project management related activities (e.g. project’s plans), requirements document, description of software architecture, user-interface prototype, and test specification **(as described in section III)**, along with an identification of the group’s name and its members.
   2. Brief summary of eight group meetings, along with respective attendees, agenda, minutes, actions taken, and group leader during these meetings.
   3. A signed individual effort contribution sheet, where each member in the group should sign against his/her estimated contribution in the project from inception to completion of group work. The total estimated contribution should be 100%. For example, a group of 5 students may have the following effort-contribution, 15%, 25%, 25%, 20%, 15%.
3. An individual report **by each group member** **(COURSEWORK III, deadline: Thursday, April 12, 2018, 14.00h)** with emphasis on software engineering employability aspects as detailed in Section IV. **(4 weeks)**

**Tasks:**

You have been introduced to Rational’s Unified Process (RUP) and are being introduced to the Unified Modeling Language (UML) related modeling notation in association with this module. You are required to provide an object-oriented solution to the problem described in Section V. You are required to utilise Rational’s Unified Process to guide you in achieving the objectives of this project as per the follow up provided in both lectures and tutorials with customization of this process (i.e. RUP) to fit the deliverables of this project within the timescales set for the assignment.

You should use UML to document your requirements and design models. You are not constrained to use specific UML and requirements management tools. You may use Visual Paradigm, Rational Rose, or StarUML, to specify your UML models. This should be the team’s decision (i.e. your group) to agree on and specify in your project’s proposal. Use MS-Word to specify user requirements and use-cases following the MammoGrid use-case template provided in the assignment folder on Blackboard. However, using a requirements management tool to specify your use-cases is highly encouraged to do but please note that this IS NOT a REQUIREMNT of the ASSIGNMENT.

**ALL ASSIGNMENT DELIVERABLES SHOULD BE SUBMITTED ONLINE USING BLACKBOARD FOLLOWING UWE FORMAL SUBMISSION PROCEDURES, BOTH FOR GROUP PROJECT AND INDIVIDUAL DELIVERABLES. ANY SUBMITTED WORK NOT ONLINE WILL NOT BE ACCEPTED AND WILL NOT BE MARKED.**

Please record the following milestones/dates in your diary:

**Submission of Project Proposal: Thursday, December 7, 2017, 14.00h.**

*Informal Sign-off of the Requirements Document: in tutorial session week starting the 12th of February, 2018.*

*Informal Sign-off of the Solution-Architecture Document: in tutorial session, week starting the 26th of February, 2018.*

*Informal Sign-off of the System Prototype: in tutorial session, week starting the 12th of March, 2018.*

*Informal Sign-off of the Testing Document: in tutorial session, week starting the 19th of March, 2018.*

**Submission of Final Group-Work Deliverables: Thursday, April 12, 2018, 14.00h.**

**Submission of Individual Project Report: Thursday, April 12, 2018, 14.00h.**

Please note that the above ***informal sign-off dates*** imply no official submission and are intended to guide you through the project and serve the basis of tutor and self-assessment of ongoing progress for final assessment of individual contribution. In addition, your tutors will use these sign-off milestones to monitor your progress (both the team and individuals), unofficially assess your performance, and keep records of sign-offs in their diaries.

***PLEASE USE BLACKBOARD GROUP REPOSITORY - OFFICIALLY ALLOCATED TO YOUR GROUP BY YOUR TUTOR - TO UPLOAD ALL WORK IN PROGRESS DOCUMENTS FOR THE GROUP DELIVERABLES, BUT NOT FOR YOUR INDIVIDUAL THIRD ASSIGNMENT REPORT.***

**II. The Project Proposal: (15% of the final mark) Coursework I**

As a group, ***you need to submit the project proposal* (use a coversheet to write the name of your tutor and practical session number)*.*** You need to include the following information in this proposal:

1. Rephrasing of the problem definition (in section IV) to briefly describe the main outcomes of the project. This needs to concentrate on functional requirements of the system given below, and be documented as part of a use-case model showing actors, and core use-cases. You ARE NOT REQUIRED to DESCRIBE EACH USE-CASE in DETAIL. ONLY A SHORT DESCRIPTION OF THE USE-CASES is REQUIRED at THIS STAGE. Also, YOU ARE REQUIRED TO DEVELOP A USE-CASE MODEL using USE-CASE DIAGRAMS with <<extend>>, <<include>> relationships.
2. Sources of information in relation to the project’s run, including the concerned stakeholders and the material to be consulted.
3. Tools to be used in different activities within the life-cycle of the project.
4. Initial project plan that is in-line with Rational’s Unified Process. This plan needs to include, but not limited to:
   1. Initial project schedule to show tasks start and finish dates for each of the FOUR PHASES OF RUP within the life-cycle of the project from November 2017 to April 12, 2018. Also, this schedule needs to show the duration in person working days (or fraction of), and tasks’ dependency.
   2. Resource allocation table to show who is working on what.
   3. Risk management to show identification and description of risks that are associated with the run of this project (including all its related issues) within its life-cycle. You need to analyze these risks so as to prioritize them and suggest mitigation strategies.
5. Name of your group along with details of group members including contact details.

Once this proposal is submitted and received by your tutor, you will receive feedback from him/her in the first/second week of the second term. Your tutor will keep this project proposal with him/her for final assessment as part of the final group-project’s report, but you SHOULD ALWAYS HAVE YOUR ELECTRONIC COPY OF THE UPDATED PROJECT PROPOSAL every practical session.

**III. The Group-Work Deliverables: (65% of the final mark) Coursework II**

Please make your document highly readable and structured. It may be a good reminder to pay attention to the following in your document.

* + Table of contents.
  + Introduction
  + Section numbering.
  + Pagination.
  + High traceability.
  + Citations and bibliography section.

As a general rule, please assign one team member to lead the tasks below with the whole group taking responsibility of completing all tasks. **Should problems occur you need to consult your tutor and the module leader in not more than TWO WEEKS from the start of any group problems or difficulties.**

Please use e-mail to share and communicate any problems regarding the progress of the project with your colleagues in the group but copied to your tutor and module leader when needed. Also, your tutor will guide you to use Blackboard for this project as a shared repository for the different group members’ deliverables.

Furthermore, you need to provide the following ***deliverables*** as part of your project’s ***final*** ***group-work:***

1. Project Management: **(5%)**
2. An updated project plan showing phases, deliverables, and tasks’ dependency, if any.
3. Show changes to your project plan (compared to your initial submitted plan as part of your initial project proposal) during the life-cycle of the project, if any. (reviews of plans as per progress in the project)

1. Also, you need to submit the actual resource allocation table vs. the planned one, showing who worked on what and for how long.
2. Minutes of group meetings: You need to show minutes of eight key project meetings, where four of these meetings are attended by your tutor during practical sessions **along with all these minutes of meetings SIGNED OFF by your tutor.**
3. **Requirements Document** with concentration on the following issues (which may be used as a suggested structure for this document): **(30%)**
4. ***Introduction*** to the problem: one team member to write the introduction to the document and the rest of the team to read and validate.
5. ***Actors:*** these have already been identified in the initial project proposal, but it is the time to correct any mistakes or missed ones. Also, one team member is to write a short description of each actor with the rest of the group to validate all the actors’ specifications.
6. ***Specifications of the core use-cases:*** You are urged to use the MammoGrid use-case template example in the assignment folder of this module accessed through Blackboard. Every team member **should specify only ONE use-case and should be his/her own contribution only.** Failure to do so SHALL result in that team member having 0% contribution to this section.
7. ***System* Models:**
8. ***Class Diagram:*** to model inheritance, association, aggregation, composition, and dependency, where available. You need to include ONLY ENTITY CLASSES and their attributes BUT OTHER CLASS TYPES ARE ENCOURAGED AND NOT PENALISED IF NOT INCLUDED. This is a group-based activity and everyone must participate in the brainstorming session(s) to deliver the class model. Your tutor will have a record in his diary of the individual team members participating in this task. You need to decide on one team member to finalize the class diagram.
9. ***Use-Case Views:***

* Produce a System-Level Use-Case View: **this is a group-based activity similar to the above task.**
* Every team member **who specifies the use-case in part 2.c** should produce the corresponding use-case view, showing interaction with respective actors and relationships (<<extend>> and <<include>>) with other non-core use-cases. Failure to do so SHALL result in that team member having 0% contribution to this section.

1. Every team member who specifies the use-case in part 2.c should produce a respective ***SEQUENCE DIAGRAM for ONE MAIN SUB-FLOW*** that relates to this use-case. Failure to do so SHALL result in that team member having 0% contribution to this section.
2. ***Non-Functional Requirements (NFRs):*** this is a group-based activity to identify and specify NFRs that relate to the problem in this assignment. These NFRs will have to be related to **product, process, and external** requirements. Assign one team member to finalise the specifications of these NFRs based on your agreement (as a group) of the identified NFRs.
3. ***Glossary:*** group-based contribution with ultimate responsibility relayed to one team member to finalise.

**Note: Every team member should participate in all deliverables and in particular work on his/her agreed use-case specification, use-case views, and sequence diagrams. All team members should validate this document.**

1. ***The solution architecture*** **(8%)**: Use the “4+1 views” model of software architecture discussed in this module to describe the Implementation/Component views of the anticipated system’s architecture. Show how the use-case view drives and assists in the development of these views.

**Note: every team member should participate in the discussions to develop the implementation/component views and at least one member to do the documentation, followed by document validation by all team members.**

1. ***Software Prototype (10%):*** this needs to be developed using an object-oriented programming language preferably using Java for the front-end GUI and business logic with MySQL as the back-end DBMS. You are expected to show adherence to key usability aspects, and the use-case and class diagram you have developed as part of your requirements document.

**Note: At least one team member should develop this prototype and then to be validated by all other members of the team. *You should agree with your tutor on the tool that you need to use by the time you submit your project proposal.***

1. **Software test specification (12%):** you need to provide a set of suggested test approaches/strategies to test the proposed system:

**-** the anticipated software and hardware tools needed for testing,

- functional and non-functional requirements to be tested, test cases, and

- test recording mechanisms.

**As an individual, you are only required to produce test cases for the use-cases you have already specified in the requirements document.** *This means that the software test specification document will have* **both individual contribution (i.e. test-case vs. use-case vs. sequence diagram) and group-based contribution to the remaining parts.**

**IV. The Individual Report: Coursework III**

This part constitutes 20% of the assignment’s total mark and should provide critical assessment of the areas covered in this report. This report shall not exceed 2500 words (not including appendix) and shall be authored by each individual in the project.

This report should be reflecting critically on the professional development process you have been involved in this year, via both this software engineering group project and the “Power-up” programme, and the outcomes of these in terms of your career goals and professional development so far.

More specifically, you should, in your report:

* maintain through the year a “personal Power-up portfolio” (as specified separately on the Blackboard Power-up web site);
* submit a copy of your “personal Power-up portfolio” as a compulsory appendix to your report, referring to it intensively in the report body;
* give an account of the major problems you faced in the project;
* outline your experience of the different sections of the assignment and the lessons learnt;
* draw on the role(s) you have played during your software engineering project, linking your treatment to the knowledge you have gained on the typical professional roles of the Software Engineer and common graduate destinations from BSc Computing and BSc Computer Science;
* reflect on how well or otherwise the roles you have played this year match with your emerging career goals;
* reflect on how, in your project team, different roles interacted, and how you might improve multi-role team work in the future.
* Suggest TWO enhancements to the developed software application, ONE functional and ONE non-functional reflecting on the particular roles to be taken by the software engineers in attending to these suggested DMS enhancements.

**V. The Problem:**

# *In a step towards improving customer service and making aggressive sales, Successful Brothers (SB) has decided to implement the distributed dealership paradigm. This implies creating a network that links all dealers in five locations in the West of England. Dealers are linked to the main site in Bristol.*

# *A bespoke Dealer Management System (DMS) is to be implemented at each dealership site. The DMS is to provide a pool of computing services for anything the dealers are likely to need. In particular, the DMS should allow for logging in cars for servicing at reception; issuing parts to both service staff and customers; and invoicing customers for workshop services, car and parts sales. Also, all transactions that involve payments are to be posted to the existing accounting system of the dealership.*

# *Each dealership is to have its own implementation of the DMS including its own database.*

# *The availability of different types of parts is of high priority. It is not necessary that a certain dealership keeps stock of all types of parts. If a part does not exist in a dealership’s store, then the DMS needs to make an order by passing it to the closest dealership. In the case that a part does not exist at any dealership, then the main DMS in Bristol will make an on-line order by linking to the agent of that part. Also, the DMS should have the facility to have an order-point where a minimum stock should be kept for particular types of parts*

# *Inevitably, the DMS should be able to produce invoices of parts issued, and workshop services for customers of the dealership. The contents of these invoices should be obtained from the existing parts’ and customers’ databases.*

# *In addition, sales of cars represent a major source of income to each dealership and SB as a whole. Each dealership employs a number of sales persons who look after their customers starting from the initial stage of finding what the customer needs, searching for the appropriate car, relocating it (if not local), servicing, and delivering it to the customer.*

# *For simplicity, the finance service is omitted from this project and a full cash payment is assumed. Moreover, managers with different responsibilities at SB would also like to use DMS to help them obtain helpful information about the performance of the staff they supervise.*

# **[N.B. Please note that normal rules about plagiarism and collusion apply as usual. Plagiarism in group deliverables will affect the overall group deliverables. Individual plagiarism in individual deliverables will affect the overall individual contribution]**

# **Dr. Mohammed Odeh,**

# **Module Leader,**

# **October 30, 2017.**