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COMP1216. Software Modelling and Design (2022-23)

Coursework 1: Requirements Analysis, Specification, and Design

Issue date:	17 February 2023
Submission deadline:	4pm, 10 March 2023

This coursework, to be undertaken in groups of *five**, will contribute 15% towards the total for the unit (15% will be contributed by your second coursework). The assignment concerns aspects of the requirements analysis, specification, and design of an online auction system. It is intended to develop your skills in analysing requirements and designing a software solution using UML tools. It is intended to prepare you for your 2nd-year group software engineering project.

Please bear in mind the University Academic Integrity regulations: http://www.calendar.soton.ac.uk/sectionIV/academic-integrity-regs.html.

1 System Outline: An Online Auction Service

The set of requirements for an online auction service are as follows.

REQ 1	The online auction service allows users to submit items for auction and to bid for items that are being auctioned.

REQ 2	Users must be registered with the system in order to be able to submit items for auction and in order to place bids. Thus, a user can take both seller and bidder roles. User name, status, login id and password are recorded. User status records feedback given to the user by other users, and any penalty points the system has added.

REQ 3	The system should be able to manage multiple auctions.

REQ 4	A user (seller) with no more than two penalty points may submit an item for auction. The system creates a new auction and opens the auction to bids from other users (bidders). The system makes available the auction information the seller's feedback and penalties. An auction has only one seller. No user may be a bidder for an auction for which she is the seller.

REQ 5	When a seller submits an item for auction, she must provide a name for the item, start and end times for the auction and a reserve price for the item.

REQ 6	The seller may cancel her auction without penalty at any time until a bid no less than the reserve price is accepted. She may cancel after such a point and before auction closure but will then receive a penalty point. When an auction is cancelled all bidders are informed.

REQ 7	When a bidder makes a bid on an auction, the bid must be higher than the current highest bid for that auction.

REQ 8	When an auction duration has passed, that auction is closed.

REQ 9	For a defined period after auction cancellation or closure, bidders may provide feedback on the seller.

REQ 10	A closed auction succeeds if the highest bid is at least as high as the reserve price, otherwise it fails. When a closed auction succeeds, the winning (highest) bidder is informed.

REQ 11	A seller should be able to see the status of their auction at any stage after their auction has started.

2 Tasks

Place yourselves in the role of a team including product managers and designers of the system described above and write a report including

1. *Brief title/introduction/comments.* These should include a brief description of each member's contribution. *(max 1 page)*

2. (*4 marks*) *Scope of the system.* Define the scope of the system, including *Needs*, *Goals*, *Business Case*, *Stakeholders*, *High-level operational concepts*, etc. (*max 1 page*)

3. (*9 marks*) Three full scenarios cover each of (i) successful, (ii) failed, and (iii) cancelled auctions. *(max 1 page per scenario)*

4. *(6 marks)* Two full use case descriptions. You should refine the scenarios you developed for Question 3. *(max 1 page per use case description)*

5. *(5 marks)* A UML use case diagram. You should include all relevant use cases in your diagram. *(max 1 page)*

6. *(6 marks)* A UML class diagram including attributes, operations, associations, multiplicities, and inheritance. Here you should consider all possible classes of the complete system. *(max 1 page)*

7. *(8 marks)* Two UML sequence diagrams, corresponding to the use cases you developed in Question 4. *(max 1 page per sequence diagram)*

8. (*6 marks*) An activity diagram for an auction. (*max 1 page*)

9. (*6 marks*) A state diagram for an "Auction" object from creation to close. (*max 1 page*)

Total pages. *no more than 13 A4.* If you do not use the provided LATEXtemplate, please use Arial, font size 11points, 1.5 space.

LATEXtemplate. The LATEXis provided as a zip file from the same EdShare repository. We strongly recomment you to use https://overleaf.com for cloud-based LATEXcollaboration. Remember to *Log in through your institution* with your University account.

Marking and advice. Credit will be given for

- covering all specified functionality in use case analysis, all required structure in object modelling, all required behaviour in dynamic modelling,

- correct and appropriate use of style and notation; simple and maintainable models,

- neat and readable presentation; diagrams preferably drawn with a suitable tool.

3 Submission Instructions

Each group should submit a written report (PDF format, *one report per group*) giving your answer to each of the tasks above. Clearly indicate your group number, member names and email IDs on the front page. Your diagrams should be produced with a drawing tool (e.g., http://lucidchart.com or http://app.diagrams.net). Your report should be submitted **electronically** using the automated hand-in facilities found on the ECS webpage at https://handin.ecs.soton.ac.uk/.

If you feel there are any ambiguities in the requirements feel free to make your own interpretation, but make sure any interpretations you make are *clearly indicated in the report*. You should work *together as a group* to accomplish these tasks. It is the responsibility of each group to make initial contact and arrange their own group meetings. Please inform us of any problems contacting your group members. You should *NOT* discuss your solutions with other groups.

NB: The group size is *five*. It may be necessary to run groups of four depending on the size of the class, or any students dropping out. In these cases, the workload will be reduced accordingly.

- Group of four: 1 sequence diagram only, other components as above.

- Group of three: 1 scenario, 1 use case, 1 sequence diagram only, and other components as above.