



**DUBLIN CITY UNIVERSITY**

**SEMESTER ONE EXAMINATIONS 2010**

**MODULE TITLE:** Software Specification  
**MODULE CODE:** CA228  
**COURSE:** BSc. in Enterprise Computing  
**YEAR:** 2  
**EXAMINERS:** Dr. Denise Leahy  
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**TIME ALLOWED:** 3 Hours  
**INSTRUCTIONS:** Please answer ALL questions.  
All questions carry equal marks

*Requirements for this paper*  
*Please tick (X) as appropriate*

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|--------------------------|------------------------------|
| <input type="checkbox"/> | <i>Log Table</i>             |
| <input type="checkbox"/> | <i>Graph Paper</i>           |
| <input type="checkbox"/> | <i>Attached Answer Sheet</i> |
| <input type="checkbox"/> | <i>Statistical Tables</i>    |
| <input type="checkbox"/> | <i>Floppy Disk</i>           |
| <input type="checkbox"/> | <i>Actuarial Tables</i>      |

**THE USE OF PROGRAMMABLE OR TEXT STORING CALCULATORS IS  
EXPRESSLY FORBIDDEN**

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DO SO**

**Question 1****[Total marks: 20]**

1 (a) [7 marks]

Describe the traditional *waterfall model* of software development and give its main advantages and disadvantages.

1 (b) [7 marks]

Describe the *spiral model* of software development and gives its main advantages and disadvantages.

1 (c) [6 marks]

Compare and contrast the traditional *waterfall model* and *iterative models* of software development, stating when each approach would be more appropriate within a software development project.

**Question 2****[20 marks]**

2 (a) [6 marks]

Define what is meant by *functional requirements* and *non-functional requirements*, giving examples of each.

2 (b) [6 marks]

Define what is meant by *user requirements* and *system requirements*, stating who is most likely to make use of them in the software development process.

2 (c) [8 marks]

Describe the different techniques which can be used for the elicitation of requirements.

**Question 3****[20 marks]**

3 (a) [7 marks]

Give an overview of *SSADM*, detailing in particular the different viewpoints which are used for modelling, and the different diagrams which are used within each of these viewpoints.

3 (b) [7 marks]

Give an overview of *UML*, detailing in particular the different viewpoints which are used for modelling, and the different diagrams which are used within each of these viewpoints.

3 (c) [6 marks]

Compare and contrast *structured systems analysis* and *object-oriented analysis*.

**Question 4****[20 marks]**

All parts of this question relate to the description in Appendix A.

4 (a)

**[6 marks]**

Based on the description draw a Logical Data Structure (LDS) and label all the relationships between the entities.

4 (b)

**[6 marks]**

Create a top level Context Diagram for the description.

4 (c)

**[8 marks]**

Create a level 1 Data Flow Diagram (DFD) for the description based on your Context Diagram.

**Question 5****[20 marks]**

An ATM has a screen, a card reader, a small printer, a cash dispenser and a keyboard. The keyboard has numeric buttons, an enter key and a clear key. On both the left and right of the screen are three buttons that allow selection of any options displayed on the screen. The ATM is connected to the bank via telephone line. The ATM provides facilities to dispense cash and to display the current balance. The user must first offer up their card to the reader. The display then asks the user to enter their PIN, via the keyboard. If this is successful, the display presents a set of options. The system must be highly robust, since it is to be used by untrained bank customers in public places.

5 (a)

**[8 marks]**

Identify four use cases for the ATM system and draw the corresponding use case diagram. Write clear descriptions for any three of the use cases.

5 (b)

**[6 marks]**

On the basis of the above problem statement and the use case descriptions, identify candidate domain classes for the system. Draw the corresponding class diagram indicating any significant associations between classes.

5 (c)

**[6 marks]**

For any two of the use cases described in 5 (a), present an interaction diagram showing how the use case is implemented (or realised) by a collaboration of some or all of the classes of part 5 (b).

## **Appendix A: TwoAtTheFront**

TwoAtTheFront is a ticket agency, dealing in concert and theatre tickets. All of their business is conducted over the telephone, with customers ringing up to request tickets for a wide variety of performances.

Concert and theatre venues provide TwoAtTheFront with a constant stream of information on forthcoming events, which is then used by TwoAtTheFront's manager to compile a fixture list for use by the sales staff in responding to customer calls. The manager will also select a number of events for which TwoAtTheFront will purchase tickets in advance of customer requests (e.g. for popular events). Details of these 'pre-purchase' orders as they are known are passed to the post clerk who is responsible for placing orders with each venue. The post clerk sends out each order with its payment attached. Once tickets are received the post clerk files them in the tickets file.

When customers ring the sales team their ticket requests are checked against the ticket file. If pre-purchased tickets are available they are put in an envelope marked with the customer's name and filed at the back of the ticket file. If not, the sales team fill out a ticket request form and put it in a desk tray for collection by the post clerk, who will then place an order with the appropriate venue in the same way as for pre-purchased tickets.

Details of the customer and the tickets are passed to the payments section for invoicing (by the sales team for pre-purchased tickets and by the post clerk for new tickets). The payments section will then send an invoice to the customer, and await payment if the customer is paying by post or accept payment immediately for credit card holders. A copy of the invoice is placed in the invoice file for matching with payments, and once paid a further copy is placed in a tray labelled 'despatch list' for collection by the post clerk.

The post clerk collects paid invoice copies three times a day, and retrieves the appropriate tickets from the ticket file for despatch to customers.