SE201.3 Systems Analysis and Design

Model paper

This paper has two sections. Answer any four (04) questions given in the Section B.

Section A:

Case study for questions in Section B

Hightec Computer Repairs

Hightec is a computer repair company operating out of a small workshop. The owner, Peter is the only person working in the company but he hopes to expand and employ more engineers in the near future. At present Peter holds much of the information about repair jobs in a filing cabinet but this is rather disorganized and he realizes that a computer system would be a better method especially as any new members of staff would also need access to this information.

When a customer brings in a faulty computer Peter logs the fault and the customer's details giving him/her an estimated date for the repair to be completed. Every day he checks the list of repairs and selects the jobs to be done that day. If he finds he doesn't have the required parts in stock for a repair he places a purchase order with his supplier and reschedules the job to a later date. When a repair is complete and the customer comes to collect the computer, Peter gives him/her an invoice and the customer pays immediately. Once a week Peter checks his stock of parts, and orders any that are getting low from his supplier.

Section B

Question 1

1. Explain the differences between a physical and a logical data flow diagram (DFD). (9 marks)

2. List the processes and the external entities that you would include on a LOGICAL context level data flow diagram (DFD) of the Hightec company in Section A. (You do not need to draw the DFD). (7 marks)

3. Produce a Use Case diagram for the Hightec system. (9 marks)

Question 2

1. List five (05) techniques for eliciting requirements. (5 marks)

2. Explain four (04) of these techniques in detail including the advantages and disadvantages of each technique. (20 marks)

Question 3

1. Describe a system development method of your choice. You should include a description of the stages/phases of your method. A diagram of the method should be produced if appropriate. (15 marks)
2. Discuss whether your chosen method would be suitable for developing a new computer system to support Hightec as described in the case study in Section A. (10 marks)

Question 4

Consider the following extra information about the Hightec system described in the case study in Section A.

"Hightec plan to employ two types of engineers: full time engineers and part time engineers. The following data should be stored about each engineer: Engineer number, Engineer name, Address, Tel number. For full time engineers Annual salary is also stored, while for part time Hourly rate and Hours worked are stored. An object of class Computer consists of a System unit, a Keyboard, and a Monitor."

1. Explain the following relationships between classes using examples from the Hightec company system to illustrate your answers:
    a. Association,
    b. Aggregation or Composition,
    c. Generalisation/Inheritance. (15 marks)

2. Discuss at least TWO similarities and TWO differences between class diagrams and entity relationship diagrams. (10 marks)

Question 5

1. Explain how the following UML diagrams relate to each other:
    a. class diagrams,
    b. sequence diagrams,
    c. state transition diagram (7 marks)

2.
    a. Give a brief explanation of the role state transition diagrams play in systems modeling. (4 marks)

    b. Produce a state transition diagram for the class Job in the Hightec system described in the case study in Section A. You may assume that objects of this class are affected by the following 'events':

    cancel job, completion of job, create job, delete job, reschedule job, schedule job.

    Please note that jobs are deleted automatically 6 months after their completion or cancellation. (14 marks)

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