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CICT PART III SECTION 5

SOFTWARE ENGINEERING

WEDNESDAY: 28 November 2018.

Time Allowed: 3 hours.

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

QUESTION ONE

- (a) Explain the following terms as used in software development:
- (i) Process modelling. (2 marks)
 - (ii) Data modelling. (2 marks)
 - (iii) Logic modelling. (2 marks)
- (b) Differentiate between “system engineering” and “software engineering”. (4 marks)
- (c) ABC Ltd. has decided to undertake a software engineering project. The project involves the development of an enterprise resource planning (ERP) software to assist in managing the whole organisation. A new information technology manager has been hired to spearhead the project.

Required:

- (i) Enumerate six activities that the newly recruited manager should include in the above project. (6 marks)
 - (ii) Explain any two categories of risks that might threaten the project. (4 marks)
- (Total: 20 marks)**

QUESTION TWO

- (a) Using an illustration in each case, describe the following Jackson Structured Programming (JSP) components:
- (i) A fundamental operation. (2 marks)
 - (ii) Sequence. (2 marks)
 - (iii) Iteration. (2 marks)
 - (iv) Selection. (2 marks)
- (b) (i) Explain the meaning of the term “function-oriented metrics”. (2 marks)
- (ii) Highlight two advantages of function-oriented metrics. (2 marks)
- (c) (i) Suggest five reasons why companies choose in-house software development. (5 marks)
- (ii) Outline three methods of classifying software coding standards. (3 marks)
- (Total: 20 marks)**

QUESTION THREE

- (a) The technical director of your organisation has assigned you the task of managing and controlling the planning of a web-based application. The application will provide cultural news for elderly people. Data for the application shall be taken from an existing similar mobile application. The Director has instructed you to take into account the impaired eyes and the slow reaction time of these people, as well as their hands that sometimes do not execute the fine movements in a precise way.

Required:

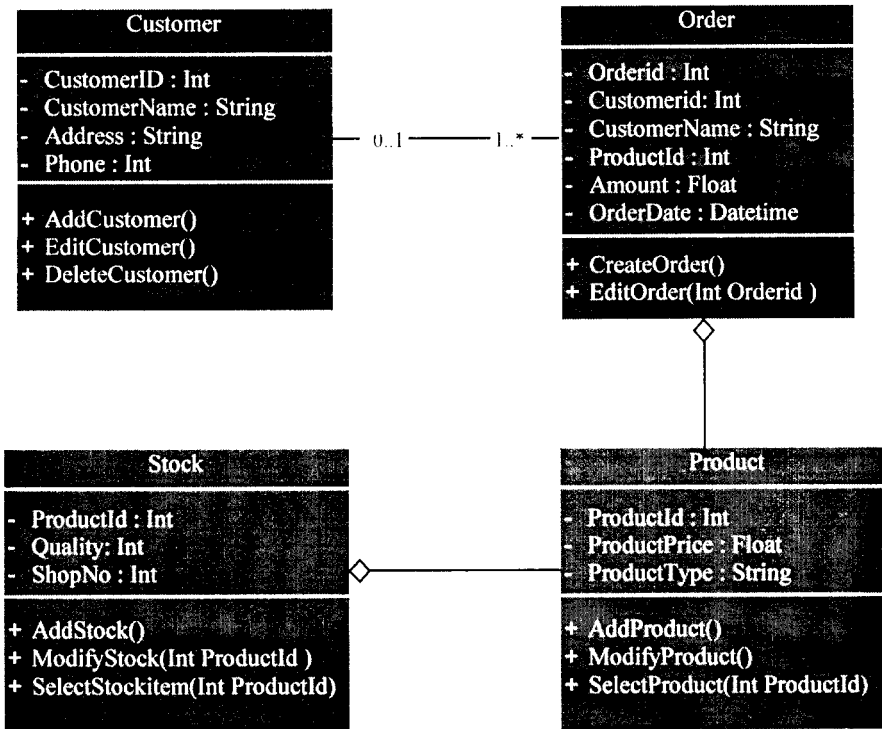
Discuss three basic principles you would consider during the planning of the graphical user interface of the application. (6 marks)

(b) A software developer chooses to introduce techniques of extreme programming in a unified software development process.

Citing an appropriate reason, enumerate four extreme programming techniques he could choose. (4 marks)

(c) The diagram below shows a class diagram for an order processing system:

Class Diagram for Order Processing System



Required:

Draw a component diagram that represents the structural relationship of the above order processing system. (6 marks)

(d) In a software conversion plan, the software section lists the software and databases required to support the conversion. The plan describes all software tools used to support the conversion effort.

Examine four of the software tools described above. (4 marks)
(Total: 20 marks)

QUESTION FOUR

(a) Stating the sites in which they are conducted, describe the following types of software tests:

(i) Alpha test. (2 marks)

(ii) Beta test. (2 marks)

(b) Alice and Daughters Company Limited uses a legacy software to run its core business. The management of the company intends to enhance the system to accommodate some web-based features. This would enable the company to compete effectively with its competitors. The company has contracted you to re-engineer the legacy system.

Required:

Assess two levels at which you would reengineer the system. (6 marks)

(c) Appraise two types of product documentation in software engineering. (4 marks)

(d) "User requirements are critical in systems development".

With reference to the above statement explain six tasks that a software engineer needs to undertake to ensure that the final product meets the customer's expectation. (6 marks)

(Total: 20 marks)

QUESTION FIVE

(a) The information technology (IT) department in an organisation could customise the traditional balanced score card (BSC) quadrants to fit into an IT BSC quadrants by using different key performance indicators (KPIs) from other departments in the organisation.

Required:

Suggest in each case, two KPIs for the following quadrants:

- (i) Customer quadrant. (2 marks)
- (ii) Operational excellence quadrant. (2 marks)
- (iii) Corporate contribution quadrant. (2 marks)

(b) Differentiate between the following terms as used in software engineering:

- (i) Functional and non-functional requirements. (2 marks)
- (ii) Quality of design and quality of conformance. (2 marks)
- (iii) Software review and software inspection. (2 marks)

(c) A software company you work for intends to roll out a pilot project of a new software. It is your responsibility to ensure that risks that might lead to an unsuccessful organisation-wide implementation at a later stage are reduced. You are keen on giving the personnel and users a hands-on experience.

Required:

Propose four key factors that you would consider in order to ensure that all the people involved are appropriately guided towards a successful rollout of the project. (8 marks)

(Total: 20 marks)

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