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**KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATIONS, 2024/2025 ACADEMIC YEAR**  
**FIRST YEAR, SECOND SEMESTER EXAMINATION**  
**FOR THE DIPLOMA IN SOFTWARE ENGINEERING**  
**DSE 1004: SOFTWARE DEVELOPMENT LIFE CYCLE MODELS**

**DATE: 11<sup>TH</sup> DECEMBER, 2024**

**TIME: 11:30 AM-1:30 PM**

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

Modeling of software process has been a very challenging problem and constantly debated in the software development community in the past 30+ years, largely due to the complex nature of the software development process that involves not only the technical knowledge and skills but also many other factors, such as human, management, quality assessment, and cost. The modeling of business processes aids in the comprehension and optimization of existing business processes, and also in the conception of new business processes to make organizations more competitive and efficient. As a software engineer you are required to;

- a) Discuss the **THREE** major types of feasibility study [6 Marks]
- b) Describe the principal steps in the design phase and state the major deliverables [6 Marks]
- c) Explain the role of prototyping in systems development [4 Marks]
- d) Compare parallel and iterative development methodologies [6 Marks]
- e) Explain briefly what systems design entails [2 Marks]
- f) Distinguish between business, user, and functional requirements and give an example in each case [6 Marks]

**QUESTION TWO: (20 MARKS)**

RENEW Software Solutions is a software development company that specializes in creating custom software solutions for clients across various industries. They recognized the need to streamline their software development processes and ensure consistent quality and timely delivery of projects. To achieve this, they decided to implement a structured Software Development Life Cycle (SDLC) approach.

- a) Discuss **FOUR** factors to consider in selecting the development methodology to be used in a given project [8 Marks]
- b) Distinguish between evolutionary prototyping and throwaway prototyping methodologies [4 Marks]
- c) Describe object-oriented analysis and explain the advantages of using this technique compared to structured analysis [4 Marks]
- d) Define scope creep and explain how it is brought about by prototyping as a technique of requirements elicitation [4 Marks]

**QUESTION THREE: (20 MARKS)**

Technology is taking over the world at a rapid pace. With the exponential growth of technology across diverse industries, software solutions have become essential in every facet of the business. Because of the size and complexity of current software, there is a need to have a guiding process for development.

- a) The following are the four major phases in the Systems Development Life Cycle (SDLC). For each phase identify **TWO** deliverables and identify the techniques used to produce it.
  - i) Planning [4 Marks]
  - ii) Analysis [4 Marks]
  - iii) Design [4 Marks]
  - iv) Implementation [4 Marks]
- b) Describe the waterfall methodology of systems development and give reasons why it is currently less popular than it used to be. [4 Marks]

#### **QUESTION FOUR: (20 MARKS)**

##### **Golden Racquet Tennis Club**

Golden Racquet is a tennis club in England. The club has a number of playing courts. Most of the members of the club are local people. The club is opened daily from 10.00am to 8.00pm. New members are approved and registered by the club manager. When registered, new members provide their name, address, telephone number, etc. and after the registration they are given a unique member number. The club encourages its members to join teams, although each member can only belong to one team. When a member decides to join a team he/she should contact a receptionist either by phone or at the club, and he/she will carry out the appropriate procedure. Playing sessions (one hour long) can be booked by either a team leader or by an individual member. Each session belongs to a specific price band according to its time, day of the week, etc. The session booking may subsequently be cancelled by the person who booked it. In such a case the session will become available for rebooking. Session records are created by the manager a few weeks in advance i.e. members have a couple of weeks to book sessions. Each session is identified by its date, time and court number. Session records are deleted 6 months after their dates.

**You are required to:**

- a) Identify the processes and the external entities that you would include on a top-level data flow diagram (DFD) of the Golden Racquet tennis club. (You do not need to draw the DFD). [8 Marks]
- b) Distinguish between functional and non-functional requirements and give an example for each case [4 Marks]
- c) Produce a list of requirements for a system to support the Golden Racquet tennis club's business processes shown in the scenario. [4 Marks]
- d) Construct a use case diagram for the Golden Racquet tennis club information system [4 Marks]

#### **QUESTION FIVE: (20 MARKS)**

SDLC Partners is a business and technology consultancy, based in downtown Pittsburgh, that specializes in delivering customized digital solutions to transform organizations. Since 2004, SDLC has been providing clients with high-quality business and technology services that accelerate performance through smarter solutions. Together, the talent, processes, and leadership combine into a high-performance culture focused on working with customers to realize their vision and delivering measurable improvements and enduring solutions. That culture is built to empower, resource, and recognize people who are SDLC's greatest asset and uniqueness. They believe that engaged and active employees create the foundation of the firm's success, ensuring they deliver value to the client, company, and each other. In 2018, when SDLC saw potential areas for improvement, they made investigating and pursuing cultural growth a strategic priority.

- a) Outline **FOUR** techniques used in eliciting requirements. [4 Marks]
- b) Explain **FOUR** factors to consider in choice of software development methodology [8 Marks]
- c) Describe the advantages of using agile systems development methodologies [4 Marks]
- d) Describe **FOUR** types of skills of a software developer must possess [4 Marks]