AL-QALAM UNIVERSITY KATSINA
COLLEGE OF COMPUTING AND INFORMATION SCIENCE (CIS)
DEPARTMENT OF SOFTWARE ENGINEERING AND CYBER SECURITY

Session: 2024/2025 **Semester:** 2nd Semester

Course Title: Modelling & Simulation **Course Code:** SEN 4325

Instruction: Answer one (1) and Any three (3) Questions **Time allowed:** 2hr 30 Mins

Q 1. In a tubular form generate a pseudorandom number using the Mid-square algorithm, 1234 seed, to showcase its basic limitation. 15mrks

Q 2. Clarify this statement "Random numbers are said to be everywhere" ***Hint: Definition, types, Method of generations, and algorithms*** 15mrks.

Q 3. Explain in detail the pseudorandom number 15mrks

Q 4. In brief deliberate "System" under the following

i. Definition
ii. Components
iii. Examples at list (3) 10rmks

b. Outline the features of Conceptual and Visual modelling 5mrks

Q 5. Write a short note on **Queuing theory** considering the following 5mrks

i. Definition
ii. Discipline
iii. Parameters
iv. Metrics and Performance Measures
v. Application 10mrks

Q 6. State Little's Law 5mrks

b. A doctor's office has an average service rate of 8 patients per hour. If patients arrive at an average rate of 6 per hour, calculate the average time a patient spends in the queue. 5mrk.

c. A coffee shop has an average service time of 5 minutes per customer. If customers arrive at a rate of 20 per hour, what is the utilization of the coffee shop's service? 5mrks

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Session: 2023/2024 **Semester:** 2nd SEMESTER

Course Title: MARKET FOR SOFTWARE TECHNOLOGY **Course Code:** SEN4222

Instruction: ANSWER QUESTION ANY FOUR (4) QUESTIONS **Time allowed:** 2 HOURS

Q 1a Discuss the Global Software Market in terms of market size values in 2023, growth rate percentage, and values predicted from 2024 to 2030 compared to the previous year (2023).

Q 1b: Use examples to briefly explain the software product market and marketing technology.

Q 2a: Provide three (3) reasons why software engineers are in high demand.

Q 2b: Explain any three (3) of the following tools that a software engineer must be proficient in

i- Kubernetes
ii- Redux
iii- Docker
iv- Jenkins

Q 3a: Outline along with the first two (2) steps in shaping your Software Product Strategy Research.

Q 3b: Describe one primary advantage of the full-funnel Software Market Strategy.

Q 4a: Briefly describe any three (3) of the following software industry's various categories..

i- Programming services
ii- System services
iii- Open source
iv- SaaS

Q 4b: Discuss any three (3) major variables while considering the future of the software business.

Q 5a: Explain the career path of a software engineer in schematic form.

Q 5b: What is Software Market Analysis?

Q 6a: Discuss the market for software technology using an example.

Q 6b: Clearly describe the following. Key features of the software technology market

i- Industry Verticals
ii- Cloud Computing

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Session: 2023/2024 **Semester:** 2ND SEMESTER
Course Title: Open Source Software Development and Application **Course Code:** SEN4324
Instruction: ATTEMPT ANY FOUR (4) QUESTIONS **Time allowed:** 2 HOURS

Q1

(a) List any five (5) operations users could do on the open source software without asking permission from or making payments to any external group or person (5 marks)
(b) In the context of Open source software, discuss the meaning and context of the slogan: "Given enough eyeballs, all bugs are shallow." (3 marks)
(c) Explain the steps to creating a new repository using the Git version control system. (7 marks)

Q2

(a) Discuss in detail, any five (5) steps in Feature Development Lifecycle (10 marks)
(b) Why is a Source Code Management System important in a software development project?(5 marks)

Q3.

(a) Mention the relationship of MariaDB to MySQL in the context of version control management (3 marks)

(b) With the aid of diagram, explain the architecture of Git Version Control System on a local development environment (12 marks)

Q4

(a) Compare and contrast the specific features of Commercial Open Source software with Pure Open Source software. (5 marks)
(b) List five (5) case studies of famous open source software projects (5 marks).
(c) List five (5) characteristics of open source software development model(5 marks)

Q5

(a) List three features of Version/Source Control System (V/SCN) and briefly explain how these features support open source software development [9 marks)?
(b) List and explain any three(3) terms that the General Public License (GPL) covers (6 marks)

Q6

(a) Discuss the primary functions of Version Control System (VCS) [5 marks]
(b) Within the context of Git hub, explain the relationship between Pull request and merge command[5 marks]
(c) Explain the functions of the following git commands:
   i. git add(2.5 marks)
   ii. git commit (2.5 marks)

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Session: 2023/2024 **Semester:** 2nd Semester
Course Title: Software Engineering Economics **Course Code:** SEN4221
Instruction: Answer Any ***Three*** Questions **Time allowed:** 2 Hrs

Q1) a) What is software engineering economics? **[3 marks]**
b) If we assume that candidate solutions solve a given technical problem equally well, why should the organization care which one is chosen? **[3 marks]**
c) The decision-making process is about maximizing value, financial basis for value-based comparison of two or more cash flows are available, elaborate! **[6 marks]**
d) What is economic efficiency of a process? Give any six factors that may affect efficiency in software engineering **[8 marks]**

Q2) a) Cite the ***ten*** software engineering economics analysis methods, and draw the Flowchart of '*For-profit Decision Analysis*' **[9 marks]**
b) Differentiate between Macroeconomics and Microeconomics **[4 marks]**
c) There are many decision situations involving limited resources in which software engineering economics techniques provide useful assistance, give an example that provide a feel for the nature of these economic decision issues for each of the major phases in the software life cycle **[7 marks]**

(Q3) a) Cite the ***three*** main economic analysis techniques in resolving software engineering decisions problems **[6 marks]**
b) Reducing uncertainty in software development is crucial for delivering high-quality software products efficiently. State the ***ten*** best practices that help minimize uncertainty in software development **[10 marks]**
c) Discuss the framework for reasoning about improving software economics **[4 marks]**

Q4) a) What are Software costs? **[3 marks]**
b) Summarize the ***seven*** major software cost estimation techniques **[7 marks]**
c) What are the Fundamental limitations of software cost estimation techniques? **[10 marks]**

Q5) a) List the ***three*** main requirements for appropriate quality modeling **[3 marks]**
b) Cite and explain any ***seven*** software engineering economics challenges **[7 marks]**
c) Elaborate the problems associated to software quality cost implementation **[10 marks]**

(1) Software engineering economic : is a Weakness Flaw or other shortcoming in a system. The way Software Can ~~bebot~~ break it A.K.A Weakness
P-1-0

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Session: 2023/2024 **Semester:** 2ND SEMESTER

Course Title: Software Project Management **Course Code:** SEN4223

Instruction: ATTEMPT ANY THREE (3) QUESTIONS **Time allowed:** 2 HOURS

Q1

(a) What were the indicators of the 'software crisis' and how software project management attempt to tame the crisis (9 marks)?

(b) In what ways does software project management differ from other types of project management (6 marks)

(c) Explain the concept of Metrics-based project management (5 marks)

Q2

(a) List any five (5) major Software Project Management activities (5 marks).

(b) Within the context of software project management briefly explain the following:

i. People (2 marks)
ii. Product (2 marks)
iii. Process (2 marks)
iv. Project (2 marks)

(c) Explain how requirements are specified in the following methodologies:

i. Extreme Programming (XP) (2.5 marks)
j. Scrum (2.5 marks)

Q3

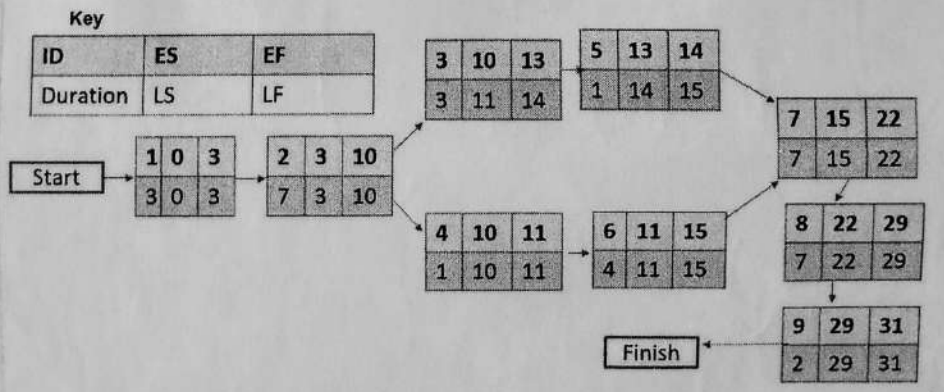

Figure 1: PERT Chart

(a) Given the above PERT chart in Figure 1 with the entries defined by the Key as follows: ES means Earliest Start, EF means Earliest Finish, LS means Latest Start, LF mean Latest Finish, construct its corresponding Work Breakdown Structure (ignore the description of the Work) (9 marks?)

(b) Use Figure 1 to estimate the project duration (2 marks)

(c) List the activities on the critical path in Figure 1 (3 marks)

(d) List and explain three (3) categories of risk management (6 marks).

Q4

(a) Distinguish between the different categories of risk with at least one example each (6 marks).
(b) What is risk Monitoring (5 marks)?
(c) In Dynamic System Development method, explain the relevance of MoScow prioritization to project management (5 marks).
(d) With the aid of a diagram, illustrate how Scrum accommodates incremental delivery (4 marks).

Q5

(a) List and explain any five(5) characteristics of Agile methodologies (10 marks)
(b) Study the information in Table 1 and answer the following questions:
    (i) Draw a simple burndown chart (6 marks)
    (ii) How many story points will be left on Friday (2 marks)?
    (iii) What are the total estimated story points on Monday?(2 marks)

Table 1: Tasks and their estimated story point

Task	**Estimated story point on Monday**	**Estimated story point on Tuesday**	**Estimated story point on Wednesday**	**Estimated story point on Thursday**	**Estimated story point on Friday**
Code the user interface (UI)	8	4	8	0	0
Code the middle tier	16	11	9	2	0
Test the middle tier	8	13	16	10	8
Write online help	12	8	4	2	1