

Internal Assessment Test 2 January 2024										
Sub:	Software Engineering and Project Management				Sub Code:	BCS501	Branch:	AIML/CSE-AIML		
Date :	14/12/24	Duration:	90 m	Max Marks:	50	Sem :	V		OBE	
<u>Answer any FIVE FULL Questions</u>							Marks	CO	R B T	
1	<p>Illustrate the Significance of Efficient project management.</p> <ul style="list-style-type: none"> Technical students might resist studying project management as it diverts them from coding. <p>Financial Stakes:</p> <ul style="list-style-type: none"> Significant amounts of money are involved in ICT projects. Example: In the UK during 2002-2003, the central government spent more on ICT projects (£2.3 billion) than on road contracts (£1.4 billion). The Department for Work and Pensions alone spent over £800 million on ICT. <p>Consequences of Mismanagement:</p> <ul style="list-style-type: none"> Poor management of ICT projects can lead to reduced funding for essential services like hospitals. <p>Project Success Rates:</p> <ul style="list-style-type: none"> A 2003 report by the Standish Group in the US analysed 13,522 projects: <ul style="list-style-type: none"> Only a third were successful. 82% were late. 43% exceeded their budget. 					10		CO5 L3		

	<p>Causes of Project Failures:</p> <ul style="list-style-type: none"> • Mismanagement is often the root cause. • The National Audit Office in the UK highlighted a 'lack of skills and a proven approach to project management and risk management' as factors contributing to project failures. 			
2.	<p>Define Project. Explain the characteristics of project.</p> <p>A project is a planned activity, according to dictionary definitions.</p> <p>The following characteristics distinguish projects:</p> <ul style="list-style-type: none"> ❖ non-routine tasks are involved; ❖ planning is required; ❖ specific objectives are to be met or a specified product is to be created; ❖ the project has a predetermined time span; ❖ work is carried out for someone other than yourself; ❖ work involves several specialisms; ❖ people are formed into a temporary work group to carry out the task; ❖ work is carried out in several phases; ❖ the resources that are available for use on the project are constrained; ❖ The project is large or complex. <p>Project Size and Difficulty:</p> <ul style="list-style-type: none"> • Larger projects (e.g., 20 developers) are disproportionately more difficult than smaller ones (e.g., 10 developers) due to increased coordination needs. • Examples and exercises in the book focus on smaller projects for ease of understanding, but the discussed techniques are relevant to larger projects as well. <p>Nature of Projects as Temporary Sub-organizations:</p> <ul style="list-style-type: none"> • Projects are temporary sub-organizations formed to carry out specific tasks. 	10	CO3L2	

	<ul style="list-style-type: none"> This setup can disrupt existing organizational authority but allows specialists to focus on a single important task. 			
3	<p>Define Software quality. Explain the quality specification in detail</p> <ul style="list-style-type: none"> Functional Requirements: Define what the system is to do. Resource Requirements: Specify allowable costs. Quality Requirements: State how well the system is to operate. <p>When there's concern about a specific quality characteristic in a software product, a quality specification should include the following details:</p> <ol style="list-style-type: none"> Definition/Description <ul style="list-style-type: none"> Definition: Clear definition of the quality characteristic. Description: Detailed description of what the quality characteristic entails. Scale <ul style="list-style-type: none"> Unit of Measurement: The unit used to measure the quality characteristic (e.g., faults per thousand lines of code). Test <ul style="list-style-type: none"> Practical Test: The method or process used to test the extent to which the quality attribute exists. Minimally Acceptable <ul style="list-style-type: none"> Worst Acceptable Value: The lowest acceptable value, below which the product would be rejected. Target Range <ul style="list-style-type: none"> Planned Range: The range of values within which it is planned that the quality measurement value should lie. Current Value <ul style="list-style-type: none"> Now: The value that applies currently to the quality characteristic. 	10		CO3 L2

4	<p>Explain ISO 9126'S major external software quality characteristics.</p> <p>ISO 9126 Software Quality Characteristics</p> <ol style="list-style-type: none"> 1. Functionality: <ul style="list-style-type: none"> ○ Definition: The functions that a software product provides to satisfy user needs. ○ Sub-characteristics: Suitability, accuracy, interoperability, security, compliance. 2. Reliability: <ul style="list-style-type: none"> ○ Definition: The capability of the software to maintain its level of performance under stated conditions. ○ Sub-characteristics: Maturity, fault tolerance, recoverability. 3. Usability: <ul style="list-style-type: none"> ○ Definition: The effort needed to use the software. ○ Sub-characteristics: Understandability, learnability, operability, attractiveness. 4. Efficiency: <ul style="list-style-type: none"> ○ Definition: The ability to use resources in relation to the amount of work done. ○ Sub-characteristics: Time behavior, resource utilization. 5. Maintainability: <ul style="list-style-type: none"> ○ Definition: The effort needed to make changes to the software. ○ Sub-characteristics: Analyzability, modifiability, testability. 6. Portability: <ul style="list-style-type: none"> ○ Definition: The ability of the software to be transferred from one environment to another. ○ Sub-characteristics: Adaptability, install ability, co-existence. 	10		
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CO2 L2

5	<p>Demonstrate the different ways of categorizing software project.</p> <p>Categories</p> <ol style="list-style-type: none"> 1. Compulsory vs. Voluntary Users <ul style="list-style-type: none"> ○ Compulsory Users: <ul style="list-style-type: none"> ▪ Users must use the system to perform tasks (e.g., recording a sale). ▪ Easier to elicit precise requirements from users. ○ Voluntary Users: <ul style="list-style-type: none"> ▪ Users choose to use the system (e.g., computer games). ▪ Difficult to elicit precise requirements. ▪ Relies on developers' ingenuity, market surveys, focus groups, and prototype evaluation. 2. Information Systems vs. Embedded Systems <ul style="list-style-type: none"> ○ Information Systems: <ul style="list-style-type: none"> ▪ Enable staff to carry out office processes. ▪ Example: Stock control system. ○ Embedded Systems: <ul style="list-style-type: none"> ▪ Control machines. ▪ Example: Air conditioning control in a building. ○ Hybrid Systems: <ul style="list-style-type: none"> ▪ Combine elements of both information and embedded systems. ▪ Example: Stock control system that also controls an automated warehouse. <p>Outsourced Projects</p> <ol style="list-style-type: none"> 1. Commercial Sense of Outsourcing: Companies may outsource parts of a project if they lack expertise or find it cost-effective. 2. Project Characteristics: Outsourced projects are typically small and need to be completed within a few months. 3. Management Challenges: Managing outsourced projects entails special challenges due to their size 	10		
			CO5	L3

and time constraints.

4. **Indian Software Companies:** Indian companies are renowned for executing outsourced software projects and are beginning to focus on product development.
5. **Revenue Impact:** Generic software products provide long-term revenue, while outsourced projects offer one-time revenue.

Objective-Driven Development

1. **Project Distinctions:** Projects can aim to produce a product or meet certain objectives.
2. **Client Responsibility:** In product creation, the client justifies the product.
3. **Objective-Driven Projects:** These projects identify solutions to problems, leading to product recommendations.
4. **Two-Stage Projects:** Initial objective-driven stage leads to recommendations, followed by product creation if needed.
5. **Technical Work by External Group:** Useful when user needs are unclear, allowing for a preliminary design and subsequent implementation based on agreed requirements.

6 Calculate ROI for the project 1, the net profit is 50,000\$ and the total investment is 1,00,000\$, and also calculate net present value the rate of interest is 10% .

Year	Project 1
0	-100,000
1	10,000
2	10,000
3	10,000
4	20,000
5	100,000
Net profit	50,000

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CO5 L4

Return on investment (ROI)

$$\text{ROI} = \frac{\text{Average annual profit}}{\text{Total investment}} \times 100$$

In the previous example

- average annual profit
= $50,000/5$
= 10,000
- ROI = $10,000/100,000 \times 100$
= 10%

Discount factor

$$\text{Discount factor} = 1/(1+r)^t$$

r is the interest rate

(e.g. 10% is 0.10)

t is the number of years

In the case of 10% rate and one year

$$\begin{aligned}\text{Discount factor} &= 1/(1+0.10) \\ &= 0.9091\end{aligned}$$

In the case of 10% rate and two years

$$\begin{aligned}\text{Discount factor} &= 1/(1.10 \times 1.10) \\ &= 0.8294\end{aligned}$$

Applying discount factors

Year	Cash-flow	Discount factor	Discounted cash flow
0	-100,000	1.0000	-100,000
1	10,000	0.9091	9,091
2	10,000	0.8264	8,264
3	10,000	0.7513	7,513
4	20,000	0.6830	13,660
5	100,000	0.6209	62,090
		NPV	618