COSMOS COLLEGE
OF MANAGEMENT AND TECHNOLOGY

Term Test II

Date: 2081/10/29			
Level	BE	Full Marks	100
Programme	BCE	Time	3 hrs
Semester	V		

Subject: - Software Engineering

- ✓ *Candidates are required to give their answers in their own words as far as practicable.*
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a Define the software metrics collection process. Explain each step briefly. 7

b Given data for an AI-based social networking site developed by ABC company: 8

Number of user inputs: 96
Number of user outputs: 51
Number of user inquiries: 48
Number of external interfaces: 37
Number of logical files: 60

Assuming that the complexity of the given website development is average, compute the function point. If the productivity of the ABC software developers is 32 FP/PM and their salary structure is Rs 39,000 per month on average, estimate the total cost of the software.

2. a What is a formal technical review (FTR)? Describe the procedure of FTR. 8

b Explain the elements of the analysis model. 7

3. a What do you mean by version control? Explain the importance configuratio audit and status reporting while configuration management. 8

b Define Cyclomatic Complexity. Using Basis path testing approach, draw the Flow Graph and find out the Cyclomatic Complexity V(G) of the following piece of code. 7

```
int a, b, c, d;
double real, num, imag, root1, root2;
d = b * b - 4 * a * c;
if (d < 0)
{ real = -b / (2 * a);
d = -d; num = pow(d, 0.5);
imag = num / (2 * a);
}
else if (d == 0)
{ root1 = -b / (2 * a);
root2 = root1;
}
else if (d > 0)
{ root1 = (-b + sqrt(d)) / (2 * a);
root2 = (-b - sqrt(d)) / (2 * a);
}
```

4. a What is software architecture? Why is it important? Explain data centered architecture with necessary diagram. 8

OR

What is SCM? Explain the role of baseline and SCI in SCM process with necessary diagram.

b Prepare level 1 DFD for the following doctor appointment system. A potential patient joins the doctor by submitting a patient application form. A new patient record is created and stored in patient record store. A patient makes an appointment by providing their patient details. An appointment card is given to the patient after they have made the appointment. The appointment details are stored in the database. A receptionist makes a telephone appointment for a patient by entering their patient details. A receptionist also cancels appointment for a patient by entering their cancelation details. Both processes update the appointment section of the database. A doctor will see a patient. When they see a patient, a list of appointment and patients records will be sent to the doctor. A doctor may want to issue a prescription by entering prescription details into the system and a prescription is be issued to the patient. 7

OR

When a person inserts his/her prepaid card, the telephone system checks for the validity and balance of the card is valid and has some balance, he/she is allowed to make phone calls STD, ISD and local calls. During the call-in-progress, the system calculates the cost in every 10 seconds and the amount is reduced from the card when the balance becomes zero, the call is terminated and the system gives the beep sounds for a second and flashes the "Balance Zero" message on the screen. The caller may request for a slip of receipt that contains the call details abo which lost incurred, when the call is finished, the system ejects the card.

i)Derive Use Cases from the above scenario and model them into a Use Case Diagram.

5. a Explain the use of data dictionary and purpose of SRS? 7
   b Discuss validation and verification in testing. Explain Control structure testing. 8

6. a What do you mean by domain analysis? What are the different components of object oriented analysis model? 8

OR

Compare and Contrast Verification and Validation. Do both make use of test case design methods and testing strategies?

b What are Class, Object, Attributes and Methods? Explain with appropriate examples. 7

OR

"Don't rush through it! Design is worth the effort." Justify the statement, with some design principle.

4. Write short notes on: (*Any two*) 2*5
   a) COCOMO Model
   b) Data dictionary
   c) Boundary Value Analysis and and Equivalence partitioning

Pokhara University

Everest Engineering College

Final Internal Assessment
Fall- 2024

Level: Bachelor
Program: BE CMP
Faculty: Science & Technology
Section: A/B
Subject: Software Engineering (5th Semester)

F.M. 100
P.M. 45
Time: 3hrs

Attempt all the questions.

1 a) What is Software Engineering? What are Four P of Software Project Management. 7

b) What is Agile Project Management. Why Prototype Model is better than Waterfall Model? 8

2 a) For a project with the size of 300 KLOC. Calculate the Effort, Scheduled time for development. Also Calculate the average resource size and productivity of the software for Organic Project Type. 8

Project Type	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi Detached	3	1.12	2.5	0.35
Embedded	3.6	12	2.5	0.32

b) Draw a Use Case Diagram of ATM Machine mentioning actors and all the relationship 7

3 a) What are the types of requirements? Explain the requirement elicitation techniques. 8

b) What is Architectural Design? Explain about Interface, Component and Database Design. 7

4 a) What are the difference between Verification and Validation? What is Alpha Testing and Beta Testing? 7

b) What is SQA? Mention Software Quality Assurance Activities. 8

5 a) What is Software Configuration Management? What are the different Software Configuration Items? SDRTDUP 7

b) Explain the role of Cloud and AI in Software Engineering. 8

6 a) What are test cases? Write about Boundary Value Analysis with an example and necessary steps. 7

b) Draw a Sequence Diagram of Food Ordering System 8

7 Write short notes on: (Any two) (2*5=10)

a) Feasibility Study

b) Object Oriented Analysis and Design

c) Software Reengineering

Best Wishes

Lumbini Engineering College
(Final Internal Exam)
Semester – fall

Level: Bachelor
Program: BE Computer 5th
Course: Software Engineering

Year : 2081
Full Marks : 100
Pass Marks : 45
Time : 3 hrs.

Candidates are required to give their answer in their own words as far as practicable.
The figure in the margin indicates full marks.
Attempt all the questions.

1. a) Describe V process model with its advantages and disadvantages 7
   b) What do you mean by agile development? Why is it important? Explain the scrum software development in detail. 8

2. a) What is Software scope? Effective software project management focuses on 4P's. Explain all. 8
   b) Explain different feasibility associated with Software. . 7

3. a) What is requirement analysis? Explain different elements of requirement analysis model. 7
   b) What do you mean by scenario based modelling and behavioural based modelling? Explain with example. 8

4. a) Obtain 1-level DFD for student registration system. 7
   b) What do you mean by design model? What are the elements of effective interface design? Explain the evaluation of the user interface with evaluation cycle diagram. 8

5. a) Demonstrate use of scenario- based testing with suitable example. 7
   b) What is Formal Technical Review (FTR)?Why is it important in SQA activities? explain . 8

6. a) What are the relationship between mean-time-between-failure(MTBF) and mean-time-to-failure(MTTF), meant-time-to-repair with service availability. 8
   b) Explain few trends, methods and tools that are likely to have influence on software engineering.

7. Write short notes on **any two:** 2×5

   a) Functional vs non-functional requirements b) People CMM c) Alpha and beta testing

Madan Bhandari College of Engineering
Urlabari-3, Morang
Final Internal Examination

Level: Bachelor
Programme:B.E.(Computer)
Year/Part:III/I

Full Marks: 100
Pass Marks: 45
Time: 3 hrs

Subject: - Software Engineering

- ✓ *Candidates are required to give their answers in their own words as far as possible.*
- ✓ *Attempt all questions*

1. a)What is software Engineering? Explain the role of software engineering in system Design. 7

   b)Differentiate between software engineering and system engineering. Software doesn't wear out but hardware does. Justify this statement with the help of failure curve. 8

2. a)Define agility. Write down four guidelines of agile methodology. Explain how we can scale agile methods. 7

   b) Define aspects. Why do you think aspect oriented programming is new paradigm. Write down some important features of Extreme Programming (XP). 8

3. a)Explain about various software myths? 7

   b)Compute the function point value for a project with the following information: 8

   Number of inputs: 44
   Number of outputs 80
   Number of inquiries: 30
   Number of files: 20
   Number of external interfaces: 4

   Assume that all complexity adjustment values are average. A review reveals that the average productivity is 40 FP/PM and the labor rate is Rs. 27440 per month. Calculate estimated project cost and estimated effort for the software.

4. a)Define software quality. How does review and inspection process help to ensure software quality. Explain with necessary diagrams. 7

   b)Why do we need software standards? Explain Key Process Areas (KPA) of Capability Maturity Model Integration (CMMI) .8

5. a)What is SCM? Explain SCM processes briefly. 7

   b)Write down the steps for basis path testing. Determine the Cyclomatic Complexity of given code 8

```
int x;
int y;
while(x<y)
{
   if(x == 5)
    printf("Correct Choice")
}
```

6. a)What is Quality Assurance ? How can we assure the quality of our software? 7

b)Draw context diagram and Level-1DFD for the following System. 8

A customer can book a ticket from the internet or can directly buy the ticket in the Movie Hall itself. There can be multiple halls within one movie theatre. The ticket operator provides a ticket with hall's stamp after checking the booking information to the customer. The guard in each hall validates the ticket and provides access to the customer inside the hall. There is also provision of complementary food item which the cafe will provide in the break time of the movie.

7. Write short notes(Any two) 10

a)User Stories

b)COCOMO model

c)Validation and Verification

NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY

(Affiliated to Pokhara University)

Dhangadhi, Kailali

Pre-University Examination

Level: Bachelor | Semester: V_Fall | Year : 2024

Programme: B.E. Computer | F.M. : 100

Course: **Software Engineering** | P.M. : 45

Time : 3hrs.

Candidates are required to give their answer in their own words as for as practicable. The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Define Software Engineering. Explain 4 p's in Software Project Management. 7

"OR"

Suppose a project size of 200 KLOC is to be developed. Software Development team has average experience on similar type of projects. The projects schedule is not very tight. Calculate the effort, Development time, Average Staff size and productivity of the project.

b) Calculate the function point, productivity, with multiple Processing Factors 5, 1, 0, 4, 3, 5, 4, 3, 4, 5, 2, 3, 4, 2 by using following given Data: 8

The number of EI(Avg): 22,
The number of EO(Low): 45,
The number of EI(High): 06,
The number of ILF(Avg): 05,
The number of ELF(Low): 02,
Effort:37 MM,
Software technical documents: 250 pages,
User related documents: 120 pages and
Budgeting/Cost: $7520 per month.

2. a) Define SDLC with its process. 8
   b) Define Software Reengineering. Explain its process. 7

3. a) Define Domain Analysis. List and Explain different kinds of System Models. 7
   b) List out and Explain the Different kinds of Architectural Design Available for Software Engineering. 8

4. a) Define Design Modeling. Explain the Software Design Process. 8
   b) Define Software Testing. Explain Testing Phases in detail. 7

5. a) Explain Test case Development Strategies by taking one test case development Scenario. 8
   b) Define Software Reliability. Explain the software Engineering Standards Available in Market. 7

6. a) Define software configuration management? Explain the need and its process. 8
   b) Define Software Reuse with its Process and Need. 7

7. Write short notes on following (Any Two) 5x2
   a) OOAD
   b) Object Oriented Design in Software Engineering
   c) Alpha Testing VS Beta Testing

Good Luck!!!

NEPAL COLLEGE OF INFORMATION TECHNOLOGY

Assessment Fall 2024

Level: Bachelor
Programme: Computer 5th (Day Shift)
Course: Software Engineering

Year: 2025
Full Marks: 100
Time: 3hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

1. a Define software myth. Write down two myths of customer, developer and management along with their reality. 8

b How can empirical estimation model be used for software cost estimation 7

Calculate risk exposure from following case.
Risk Identification: Only 60 percent of the software components scheduled for reuse will, in fact, be integrated into the application. The remaining functionality will have to be custom developed.
Risk Probability: 70%
Risk Impact: 80 reusable software components were planned.
The average component is 350 LOC and the software engineering cost for each LOC is RS. 20.0

2. a Define software process model? If customer requirements are ambiguous, which software process model should be followed and why? Explain with necessary diagram 7

b A customer goes to the XYZ restaurant and orders two pizzas and one coffee through restaurant application. Each table in the restaurant has LED display with the application installed. The customer must login to the restaurant application in order to place the order. After 20 minutes of placing the order food is served by a Robot at the customer's table. The customer pays the bills through the application and the system also allows the customer to provide feedback. 8

From this scenario draw:
a. Use case diagram
b. Class diagram
c. Sequence diagram

3. a Define functional and non-functional requirements. Explain requirement engineering process. 8

b What is design pattern? Why is design pattern important? Explain any one of the design patterns and represent it in the UML. 7

4 Define performance testing. Calculate the Cylomatic Complexity of the following code snippet: 8

```
.....while(condition)
      {
          if(condition)
          {
            if body
          }
          else if (condition)
          {
            else if body
          }
        value update
      }
```

b Define alpha, beta and acceptance testing. Describe the model of the software testing process. 7

5. a Define software reliability. Explain three phases involved in the software quality reviews. 8

b Define software configuration management. Explain version management process in detail. 7

6. a What are the fundamental sources of change in any software project? Define software maintenance and explain different types of software maintenance with suitable example 7

b. What is reuse based software engineering? What are the benefits and problems associated with software reuse? 8

or

What is cloud based software engineering? Explain how can cloud services be used in software engineering?

7 Write short notes on any of two[2*5 = 10]

a. Security by design
b. MVC framework
c. Software Engineering Ethics

Pokhara Engineering College
Internal Assessment

Level : Bachelor
Program : Computer (Sem 5)
Subject : Software Engineering

Year: 2025
Full Marks: 100
Pass Marks: 45
Time: 3 hrs.

Candidates are required to give answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Define Software and software risks. What kind of software risks can occur during software project management? How do you handle such risks? 7

   b) What is software project cost estimation? A project size of 200 KLOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Using COCOCMO model, calculate the Effort, development time, average staff size, and productivity of the project. 8

Project	a	b	c	d
Organic	2.4	1.05	2.5	0.38
SemiDetatched	3.0	1.12	2.5	0.35
Embedded	3.6	1.2	2.5	0.32

2. a) List any five classical software development model. Introduce each of them with their figure and mention their best usecase. 7

Or

Define agility. How SCRUM model can be used for software development. Explain.

   b) How Quality assurance differs with Quality Control? Explain the CMMI model for software quality management. 8

3. a) What are functional and non-functional requirements? Explain with examples of each. What sort of feasibility study would you carry out before software development? Explain. 7

   b) Draw a use case diagram for below scenario. 8

A customer visits online shopping portal. A customer may buy item or just visit the page and logout. The customer can select a segment, then a category and brand to get different products in the desired brand. The customer can select product for purchasing. The process can be repeated for more items. Once the customer finishes selecting the product/s, the cart can be viewed. If the customer wants to edit the final cart it can be done here. For final payment, the customer has to login to portal. If the customer is visiting for the first time, he must register with the site, else the customer use login page to proceed. Final cart is submitted for payment and card details and address details are to be confirmed with customer. Customer is confirmed with the shipment id and delivery of goods within 15 days.

4. a) How class diagram is constructed? Explain the entire symbols, attributes, operations and relationships with reference to a Library Management System. 7

Or

Discuss on a sequence diagram for a ATM system.

   b) Explain the Layered Architecture and Repository architecture with suitable daiagrams, 8

5. a) Explain the different levels of software testing in brief. 7

   b) What is software validation and software verification? Explain the Boundary Value Analysis (BVA) mechanism, with a code example and design a test case for it. 8

6. a) What are software configuration items (SCI)? Explain the change management process in Software Configuration Management (SCM) with suitable figure, 7

   b) Introduce Software reuse. Discuss the different types of software reuse. 8

7. Write short notes: (any two) 10

   a) Design Patterns

   b) Refactoring and Pair programming

   c) Cyclomatic Complexity

POKHARA UNIVERSITY
SCHOOL OF ENGINEERING (Internal Exam)

Level: Bachelors Programme: BE (CE) Year : 2025
Subject: Software Engineering Full Marks: 100
Pass Marks: 50
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1	a)	Compare the Waterfall and Agile (Scrum) process models. Discuss their strengths, weaknesses, and scenarios where each model is most suitable.	7
	b)	Calculate the Function Point (FP) metric for a system with the following parameters: • Inputs: 12 • Outputs: 8 • Inquiries: 5 • Files: 4 • Interfaces: 3 • Assume all complexity weights are average. Show all steps.	8
2	a)	Design a Level-0 and 1 Data Flow Diagram (DFD) for an "Library Management System." Include processes like Search Book, Issue Book, and Pay Fine.	8
	b)	Explain Use Cases and User Stories in requirements elicitation. Provide examples for an Bhatbhateni Super Store.	7
3	a)	Describe three software architectural styles (e.g., Pipe and Filter, Client-Server, and Layered) and their applications in modern systems. Use diagrams to illustrate.	7
	b)	Draw an Entity-Relationship Diagram (ERD) for a Pokhara University Student Management System, showing entities like Student, Courses, and Registration.	8
4	a)	Differentiate between white-box testing and black-box testing. Design test cases for a "payment using OTP" module using black box techniques.	7
	b)	What is FTR in SCM. How is FTR meeting conducted and what is the ultimate objective of meeting? Explain in brief.	8
5	a)	Explain the "Four Ps of Software Project Management" and their significance in managing Medium-scale software projects.	7
	b)	Define encapsulation, inheritance, and polymorphism in OOP. Provide real-world examples for each.	8

2×5

6 Write short notes on **any two:**

a) Software Reuse
b) Cloud Based Software Engineering
c) Artificial Intelligence in Software Engineering

15

7 **Case Study: MetroTicket - Urban Public Transportation System**

Story: In the bustling city of Metropolis, the public transportation authority has launched MetroTicket, an advanced ticketing system designed to streamline the process of purchasing and using tickets across various modes of transportation including buses, subways, and trams. The system aims to improve the efficiency of commuting and reduce wait times while providing flexible payment options.

Business Functions Described as Actions:

- **Register** users in the MetroTicket system, allowing them to create personal accounts for managing their travel needs.
- **Issue** various types of tickets (single-journey, day pass, monthly pass) digitally through an app and physical kiosks.
- **Validate** tickets at entry points to each mode of transportation using electronic scanners.
- **Top-up** user accounts through both online platforms and physical kiosks placed at strategic locations.
- **Provide** real-time updates about schedules, delays, and cancellations through the MetroTicket app.
- **Implement** a rewards system that accrues points for users based on their travel frequency, which can be redeemed for free rides or discounts.
- **Handle** customer service inquiries through a dedicated support center, addressing issues such as fare disputes, lost tickets, and account problems.
- **Analyze** travel data collected from ticket use to optimize routes and schedules.
- **Educate** users about the efficient use of public transportation through the MetroTicket app, including tips on off-peak travel and best routes.
- **Ensure** system security to protect user data and prevent unauthorized access to the ticketing system

Do as directed (7.5 x 2 = 15)

- Identify the classes and model them in a class diagram
- Identify the Use Cases and Expand any one Use Case (Use case should include Name, Actor, Pre conditions, Post Conditions, Description and Steps of Execution)

UNITED TECHNICAL COLEGE

Level: Bachelor | Semester: Fall | Year:2024
Programme: BE | Full Mark: 100
Course: Software Engineering | Pass Marks: 45

Candidates are required to give their answer in own words as far as practicable.
The figure in the margin indicates full marks.
Attempt all the questions.

1.

a. What is software risk? Explain how the risks are identified, mitigated, and monitored. 7

b. A technology company is developing an advanced AI-powered healthcare system. The project is highly complex, involving multiple uncertainties, evolving requirements, and significant risks. It will take approximately three years to complete, with a team of 50 developers, data scientists, and domain experts. The company seeks a software engineering model that allows iterative development, risk assessment, and continuous refinement. Propose a suitable model and justify your choice. 8

2.

a. Define outsourcing. Suppose a software project has an estimated 58,600 lines of code (LOC). The organization's average productivity is 620 LOC per person-month (PM), and the labor cost per developer per month is Rs 12,000. Calculate the estimated effort required to complete the project and determine the total project cost. 7

b. Define Requirement. Explain the requirement engineering process in detail. 8

3.

a. Obtain DFD Level - 1 for the following System. 7

A passenger can book a train ticket online or purchase it directly at the railway station. A railway station can have multiple platforms, each serving different trains. The ticket officer issues a ticket with the station's official stamp after verifying the booking details. At the platform entrance, a ticket inspector checks the ticket and grants access to the passenger. Additionally, passengers traveling in premium class receive a complimentary meal, which is served during the journey.

OR

Explain the concept of the Class Diagram along with an example of a class diagram for the Online Shopping System.

b. Draw a sequence diagram for the withdraw use case of the ATM system.

OR

Draw an activity diagram to borrow books from your respected college library management system. 8

4.

a. Define the architectural design. Discuss the layered architecture model with the help of an example. 8

b. Explain the application of artificial intelligence in software engineering. 7

5.

a. Compare and contrast verification with validation. Explain how the unit testing is carried out. 7

b. Explain basic path testing. Compute Cyclomatic Complexity from the given piece of program. 8

```
int fun(int x, int y)
{
 while(x != y)
 {
  if(x > y)
   x = x-y;
  else y = y-x;
 }
return
```

6.

a. Discuss the SPI framework. Explain CMMI in detail. 7

b. What is configuration management? Explain how Version Management keeps track of all the different versions of software components (like files, code, or documents). 8

7. Write short notes on: (Any four)

a. Reengineering.
b. ISO
c. Reviews and Inspections
d. Cloud-Based Software Engineering
e. Release Management.
f. Individual Vs integrated application systems
g. Inversion of Control (IoC)
h. COCOMO