

# POKHARA UNIVERSITY

Level: Bachelor

Programme: BE

Course: Software Engineering Fundamentals

Semester: Fall

Year : 2016

Full Marks: 100

Pass Marks: 45

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.*

- a) Can evolutional model be satisfactorily used for development of all types of project? Describe the phases of the prototyping model. 7
- b) With the given data for an online shopping site developed by ABC software developers, 8

Numbers of User Input	:	98
Numbers of User Output	:	51
Numbers of User Inquiries	:	47
Numbers of External Interfaces	:	32
Numbers of Logical Files	:	61

Assuming that the complexity of the given website development is average, compute the function point, if the productivity of the ABC S/W Developers is 35 FP/P-M, and their salary structure is Rs. 15000 per month on average, estimate total cost of the software.

- a) Why is it necessary to do software project planning? What are the different types of software risks? Explain. 7
- b) What is SQA? Discuss the activities involved as a part of SQA plan. 8
- a) "Quality and Reliability are related concepts but are fundamentally different". Justify this statement with a suitable example. 7
- b) What is software configuration management? Describe the change control process in brief. 8
- a) Obtain a level-1 DFD and design data dictionary for any one data from the given scenario. 8
- A travel agency arranges holidays for customers. Bookings are made directly by customers. When a customer makes an approach, the

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Programme: BE

Semester: Spring

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The figures in the margin indicate full marks.  
Attempt all the questions.*

- reservation clerk select appropriate flight detail & hotel detail from list which are regularly updated. The details are entered onto a provisional detail file. The customer must confirm this booking within 3 days by sending a deposit, reservation transfers the details from provisional booking file to confirm booking file. Four week before the flight is due, account send an invoice to the customer for the remaining costs. Accounts notify customer service when the full payment is received and customer services then send tickets and joining instructions to the customer.
- b) "Requirement Analysis acts as the bridge between software Engineering and Software Design". Explain? 8
5. a) What is software design? Explain different elements of design model?  
b) Explain basis path testing? Compute cyclomatic complexity from given piece of program. 7
- ```

large = x[0];
for (i=1, j<=n-1; i++)
{
    if (x[i]>large)
        large = x[i];
}

```
6. a) What do you mean by domain analysis? What are the different components of object oriented analysis model? 8
- b) What are Class, Object, Attributes and Methods? Explain with appropriate examples. 7
7. Write short notes on: (Any two) 2x5
- a) White Box Testing & Black Box Testing  
b) Data dictionary  
c) Transform Mapping versus Transaction Mapping
- b) List out some characteristics of software. Compare and contrast Prototyping Model with Spiral Model giving a suitable example. 8
- b) Compute the function point value for a project with the following information domain characteristics. 7
- Number of user input: 32  
Number of user output: 60  
Number of user inquiries: 24  
Number of files: 8  
Number of external interface: 2 7
- a) "If you do not actively attack the risk, the risk will attack you", Justify your statement. Differentiate between predictable and unpredictable risks. 8
- b) Explain software reliability? Explain the guidelines for conducting formal technical review (FTR). 7
- a) What do you mean by ISO standards for software? Explain format approaches to SQA (Software Quality Assurance). 8
- b) What is the role of a baseline and SCI's in SCM process? Explain SCM process with necessary diagram. 8
- a) Obtain a level 1 DFD and design data dictionary from any one data from the given scenario. Sajha Bus Company owns a number of buses. Each bus is allocated to a particular route, there are several buses for the same route. One or more drivers are allocated to each bus. Each route has one or more stations. One of the station is the garage where buses are kept and each bus is identified by the bus number and route. Drivers and conductors have an employee name, id, address and 8

## POKHARA UNIVERSITY

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- b) contact no.
5. a) Define software prototyping and software specification review.  
b) Explain various elements of analysis model.
6. a) Explain the characteristics of object-oriented system with example.  
b) What do you mean by data design in software design process? Explain component level design.
- Find the cyclomatic complexity  $V(G)$  for the following code.
- ```

int a,b,c;
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;
}

```
- b) Why do we need software testing? Explain Black box and Beta testing.
- c) What do you mean by domain analysis? What are the different components of object oriented analysis model?
7. Write short notes on: (Any two)
- Version Control & Change Control
  - Integration Testing
  - System Design Process

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.

- 7
- a) Is it mandatory to follow any software process model while developing software? Justify. What is the role of people in software?
- 8
- i) Compare Size Oriented Metrics and Function Oriented Metrics. A college MIS is to be developed in which the estimated lines of code is calculated to be 58,000 and a review of historical data reveals that the average productivity is 500(LOC/PM) and the labor rate is Rs.20000 per month. Calculate the estimated project cost and estimated effort for the given software?
- 8
- ii) "Adding People to a late software project makes it later". Identify the risk and develop a Risk Information Sheet.
- 7
- b) You have given the responsibility for improving the quality of software across your organization. What is the first thing that you should do? What's next?
- 7
- a) Assume that you are the manager of a project. What baselines would you define for the project and how would you control them?
- 8
- b) What models are created during the analysis phase of a software development process? Explain in brief.
- 7
- 5
- a) Do you design software when you write a program? What makes software design different from coding?
- 8
- b) Define the terms classes, inheritance and polymorphism. Describe the concept of information hiding with respect to software design in your own words.
- 7
- 2x3
- a) Illustrate "Object Oriented Paradigm as a new concept in Software" with appropriate example.
- 8
- b) Define Cyclomatic Complexity. Using Basis path testing approach

draw the Flow Graph and find out the Cyclomatic Complexity of the following piece of code.

```
int a=1,b=1,c;
for(i=1;i<=n-2;i++)
{
    c=a+b;
    a=b;
    b=c;
    printf("%d",c);
}
```

6. a) Compare and Contrast Verification and Validation. Do both make use of test case design methods and testing strategies?  
b) "Don't rush through it! Design is worth the effort." Justify the statement with some design principle.
7. Write short notes on: (Any two)
  - a) Cardinality and Modality
  - b) ISO Standard
  - c) Design Patterns

## POKHARA UNIVERSITY

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Semester: Spring

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Full Marks: 100

Pass Marks: 45

Time : 3hrs.

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The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is a software engineering paradigm? Discuss the RAD model, stating its advantages and disadvantages. 8  
b) What are the disadvantages of LOC based Estimation. Explain the function Point Metric of Software Project Estimation. 7
2. a) Why risk analysis is done? Assume that software team defines a project risk in as follows:  
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: 65% (likely)  
Risk Impact: 50 reusable software components were planned. If only 60 percent can be used, 10 components would have to be developed from scratch. The average component is 200 LOC and local data indicate that the software engineering cost for each LOC is \$20.00.  
Find risk exposure.  
b) Why are software reviews important? What are the guidelines for conducting FTR? 7
3. a) What is "configuration audit" and "status reporting"? How it aids in software configuration management? 8  
b) What do you mean by Analysis modeling? What is its importance? 8
4. a) Explain the Elements of analysis model.  
b) Define software design. Explain architectural and component level design. 8  
b) Explain the purpose of black box and white box testing. Why do we need validation testing? 7

5. a) Explain the use of data dictionary and purpose of SRS?  
b) Discuss validation and verification in testing. Explain Control structure testing.
6. a) What do you mean by object-oriented paradigm? What are the steps in identifying the elements an object model for management of object oriented software projects?  
b) What do you understand by Domain Analysis? What are the different steps involved in it?
7. Write short notes on: (Any two)  
a) Design pattern  
b) Version control  
c) Cost of Quality

## POKHARA UNIVERSITY

Semester: Fall

Year : 2018

Full Marks: 100

Pass Marks: 45

Time : 3hrs.

Level: Bachelor

Programme: BE

Course: Software Engineering Fundamentals

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.

- i) What are the common myths or misconceptions of customers regarding software engineering or development process? "Adding programmers and or project members to a late software project makes it later". Justify this statement. 4+3
- b) You are required to develop a Hotel Management System in which the estimated lines of codes (LOC) is calculated to be 85,000, and a review of the historical data reveals that the average productivity for this type of system is 200 LOC/pm and the labor rate is Rs. 7,500 per month. What would be the estimated project cost and the estimated effort for this software package? 8
- a) Discuss about objectives, constraints, process and results of Formal Technical review. 8
- b) What are the different metrics used for different software life-cycle stages, respectively? Discuss. 7
- a) What do you understand by OOA and OOD? Define Inheritance, encapsulation and polymorphism with relevant examples. 5
- b) What is Change control and Version control? Explain in detail. 10
- a) What are various design principles? Describe data-centred and data - flow architecture models. 10
- b) Explain the concepts of modularity, cardinality, modality, using a suitable example. 5
- a) In what cases you would like to conduct "Equivalence partitioning". Explain. Also list out the guidelines for conducting BVA, with examples for those guidelines. 8

- b) "Spiral Model is in agreement with the fact that technological evolution is inevitable upto infinity." Elucidate this statement.
6. a) What are the different stages of risk mitigation and planning?  
b) Explain the role of risk exposure in risk prioritization.
7. a) Assume that you are a project manager. What will be your roles and responsibilities at every stage of project management to ensure timely and efficiently completion of the project?
7. Write short notes on: (Any two)  
a) COCOMO Model  
b) Data dictionary  
c) Boundary Value Analysis

POKHARA UNIVERSITY

Level: Bachelor  
Programme: BE

Semester: Spring

Year : 2018

Full Marks: 100

Pass Marks: 45

Time : 3hrs.

Course: Software Engineering Fundamental

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.
- i) Define software metrics collection process. Explain each step in brief. 7  
ii) Given data for a AI based social networking site developed by ABC company:

Number of user input : 96

Number of user output: 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 39000 per months on average, Estimate total cost of the software.

- a) What is formal technical review? Describe the procedure of FTR. 8  
b) Explain the elements of the analysis model. 7  
a) What do you mean by version control? Explain the importance of configuration audit and status reporting while configuration management. 8  
b) Define Cyclomatic Complexity. Using Basic path testing approach draw the flow graph and find the Cyclomatic Complexity for the following code. 7

```
int f1 (int x, int y){  
    while (x!=y){  
        if (x>y) then  
            x=x-y;  
        else  
            y=y-x;  
    }  
}
```

else

$$y = y - x;$$

1

return y;

3

4. a) What is software architecture? Why is it important? Explain data centered architecture 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.

5. a) Define verification and validation. Mention the reasons for conducting black box testing.

b) What do you mean by domain analysis? Explain domain analysis process.

6. a) What do you mean by inheritance, encapsulation and polymorphism? Explain how objects interact with each other using messages.

b) Differentiate between object oriented an analysis and object oriented design.

7. Write short notes on: (Any two)

a) SCRUM process .

b) Cost of quality

c) Functional Independence

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

as practicable.  
Answers in the margin indicate full marks.

*Attempt all the questions.*

- a) What are the attributes of good software? Explain RAD model.  
b) Calculate the function point value for a project with the following information:

Number of user input : 64

Number of user output: 120

Number of user inquiries: 48

Number of External file:4

Number of user files: 16

Given that all complexity adjustment values are average, what is the risk of this project? Define software risk and

- a) Why it is necessary to estimate the project? Define.  
explain how you manage them.

- b) Define Formal Technical Review. What are the steps involved in Statistical quality assurance with how do you conduct FTR.

- a) What do you mean by SQA? Explain Statistical quality assurance with the steps of FTR.

- 4) What do you mean by SQA? Explain the steps of example.

- b) What is software quality standard for ISO certification.

- a) What is SCM? Explain the role of SCM in requirement management. How can requirement specification be integrated with design and implementation?

- b) What is analysis modelling? How can it support development process? Differentiate between data

- 9) What is analysis? How is it helpful in software development?

- a) Explain software design process and functional modeling.

- b) Define Test case. Differentiate white box testing and black box testing with examples.
6. a) What do you mean by domain analysis in OOAD? Different between OOA and OOD.
- b) Explain OOA process with the help of necessary diagram.
7. Write short notes on: (Any two)
- ISO quality Standards
  - Control Structure Testing
  - Design Patterns

POKHARA UNIVERSITY

Level: Bachelor  
Programme: BE

Semester: Spring

Year : 2019  
Full Marks: 100  
Pass Marks: 45  
Time : 3hrs.

Course: Software Engineering Fundamentals

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.

- a) You are required to develop a Hotel Management System in which the estimated lines of codes (LOC) is calculated to be 75000 and a review of the historical data reveals that the average productivity for this type of system is 244 LOC/PM and the labor rate is Rs 7,500 per month. What would be the estimated project cost and the estimated effort for this software package?
- b) What do you mean by reactive and proactive risk strategies? According to the risk table developed for a project, one of the risks is 'staff turnover will be high'. List the possible steps to mitigate this risk.
- a) Define software quality assurance (SQA). Explain formal technical review with its importance in software development and list out the steps to conduct FTR.
- b) What do you mean by SCM? Explain the importance of configuration audit and status reporting in SCM.
- a) What are the elements of analysis model? Explain each element in brief.
- b) What do you mean by design model? List any six design principles.
- a) Explain Data-flow architecture.
- a) Design a Level 1 DFD for a Food Ordering System. Include following requirements in your design.
- Customer can place an Order. The Order Food process receives the Order, forwards it to the Kitchen, store it in the Order data store, and store the updated Inventory details in the Inventory data store. The process also deliver a Bill to the Customer.
  - Manager can receive Reports through the Generate Reports process, which takes Inventory details and Orders as input from the Inventory and Order data store respectively.

- Manager can also initiate the Order Inventory process by providing Inventory order. The process forwards the Inventory order to the Supplier and stores the updated Inventory details in the Inventory data store
- b) What do you mean by software testing? List out the objective of testing. Explain software testing strategies with examples.
5. a) What are the importance of validation testing? Define cyclomatic complexity. Draw flow graph and find the cyclomatic complexity of the following code:

```
Int fun(int x, int y){
```

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

- b) What do you mean by Encapsulation? What are the steps involved in identifying the elements of an Object model?
6. a) Differentiate between object oriented analysis and object oriented design. Explain the importance of domain analysis in OOAD.
- b) What do you mean by design patterns? Explain the importance of object oriented analysis and design in software development.
7. Write short notes on: (Any two)
- Software process and process models
  - Statistical Quality Assurance
  - Functional Modeling and behavioural modeling

## POKHARA UNIVERSITY

Level: Bachelor

Programme: BE

Course: Software Engineering Fundamentals

Semester: Fall

Year : 2020

Full Marks: 100

Pass Marks: 45

Time : 3 hrs.

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.

8  
Define Software process and describe at least two process models based on evolutionary approach with recommendations to use them in different scenario.

7  
Given data for a social networking site developed by PU software developers:

Number of inputs 97

Number of outputs 52

Number of inquiries 48

Number of files 30

Number of external interface 60

Assume all the complexity adjustment values are low. Compute functional point. If the productivity is 32' FP/PM and their salary structure is Rs 13000 per month on low, estimate the total cost of the software.

8  
a) What are the different stages of risk mitigation and planning? For a risk of 'high turnover rate of developers', suggest the strategy that a project manager should follow for risk mitigation and risk transfer.

7  
b) What do you mean by SQA? Explain statistical quality assurance with an example.

7  
a) What do you mean by SCM? Explain the importance of configuration audit and status reporting in SCM.

8  
b) What is Requirements Analysis in software engineering? Explain some elements of analysis model.

8  
a) What do you mean by design model? List any six design principles. Explain call and return architecture.

8

7

8

7

7

8

8

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.

```
int a, b, c;
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;
}
```

5. a) Define Test case. Differentiate between black-box testing and white-box testing with examples. 7
- b) Explain why Encapsulation, Inheritance, and Polymorphism are three important characteristics of object-oriented systems? 8
6. a) 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 also 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. 8

OR

Prepare level 1 DFD for the Library Management System.

- i) Differentiate object oriented analysis and object oriented design. 7  
Explain domain analysis process.

Write short notes on: (Any two)

- a) Cost of quality  
b) Cardinality and Modality  
c) Mapping Requirements into a Software Architecture

2×5

**POKHARA UNIVERSITY**

Semester - Spring

Year: 2020

Level: Bachelor

Full Marks: 70

Program: BE

Pass Marks: 31.5

Course: Software Engineering Fundamentals

Time: 2 hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

**Section-A: (5×10=50)**

- 11 Can you define or elaborate, what Software Engineering actually means? What might be the different purposes or reasons behind the need of Software Engineering in Software Development? Elaborate with suitable examples. 2+3+  
What are the reasons behind learning Software Development Life Cycle? Explain any three different Software Development Life Cycle Models you think the most important to study with suitable diagrams. 2+3
- 12 What is Software Quality Assurance? Describe in brief about Software Review with importance and need of different Software Review Techniques you have learnt so far. 4+2+  
4

**OR**

What are Class, Objects, Attributes & Methods? Explain with appropriate illustrations.

Explain the concept of Object-Oriented Paradigm.

Compare Object Oriented Analysis with Object Oriented Design

3+7

Which cost estimation technique do you think is the best to calculate the cost of any software and why?

Given the data below, compute the function point value, productivity, documentation and cost per function for a project with the following information domain characteristics. 7

Number of user inputs: 27

Number of user outputs: 43

Number of user inquiries: 5

Number of files: 4

Number of external interfaces: 2

and Effort=37P-M, Technical document=360 pages, user document=129 pages, cost=Rs #000 per month (where # is the last digit of your symbol number if last digit is 0 assume # as 9) complexity adjustment values are 4,1,1,3,5,5,4,4,3,3,2,3,4,5

Q. N. 4 How is software testing achieved? Explain its importance & objectives.

Compare Black Box, Grey Box and White Box Testing.

1.5+1

What is Cyclomatic Complexity?

5+3+

Explain How to calculate Cyclomatic Complexity using Independent Path Basis.

1+3

Q. N. 5 Suppose you are appointed as the manager of a software development company. Do you agree with the fact that risk assessment helps to increase the overall revenue of a company. Explain with taking an example.

4+6

As a manager you found out that staff turnover is very high in your company. Develop a risk information sheet for mitigation of the above mentioned case.

### Section - B: (1×20=20)

Q. N. 6 Pokhara university wants to develop a system to automate the Exam Management System for Bachelor and Master Program. The University has published the routine. The system should manage application form, conduct examination and publish the results for different faculties for both master and bachelor programs (like BCA, BECIVIL, BBA, MECE etc).

6+6  
8

The system also has to facilitate all processes that include registration and enrollment of students, examination procedure, result processing and result publication.

By making necessary assumptions wherever needed, draw

a. Use-case diagram for the system.

b. ER-Diagram for this system

c. Context diagram and Level-1 Data flow diagram

**POKHARA UNIVERSITY**

Semester: Fall

Year : 2021

Level: Bachelor

Full Marks: 100

Programme: BE

Pass Marks: 45

Course: Software Engineering Fundamentals

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.

- a) Explain the term Software Crisis. Is it necessary to follow any of software process models while developing software? Justify. 7
- b) It seems odd that cost and schedule estimates are developed during software Project Planning before detailed software requirements analysis or design has been conducted. Why do you think this is done? You are required to develop a MIS system in which the estimated lines of codes (LOC) is calculated to be 86,000 and a review of the historical data reveals that the average productivity for this type of system is 350 LOC/pm and the labour rate is Rs.8,200 per month. What would be the estimated project cost and the estimated effort for this software package? 8
- a) Define Software Risks with its types. Differentiate between predictable and unpredictable risk. 8
- b) As project manager, how can you ensure customer that your software Product has quality? Explain FTR as a measure to maintain the quality of a software project. 7
- a) Why Version control is required? Discuss "configuration audit is important during software development process". 8
- b) Describe the concept of data modeling. Why data modelling is required in software development process? 7
- a) Differentiate between Transform mapping versus transaction mapping. 7
- b) Define Software Testing. Differentiate between black-box testing and white-box testing. 8
- a) What is basis path testing and cyclomatic complexity? Explain with the help of an example. 7

- b) Define object and class. explain the important characteristics of object system.
6. a) Explain the translation of OOA model to OOD Model.  
b) Explain rapid application development model with its pros and cons.
7. Write short notes on: (Any two)  
a) Requirement Elicitation  
b) Software reliability  
c) Design Pattern

## POKHARA UNIVERSITY

Level: Bachelor

Programme: BE

Course: Software Engineering Fundamentals

Semester: Spring

Year : 2021

Full Marks: 100

Pass Marks: 45

Time : 3 hrs.

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.

- a) Explain Software development myth from customers' perspective. Highlight the advantages of component-based software development over conventional approach. 7

- b) Define Measure and Metric with examples. Given the data below, compute the function point value, productivity, documentation and cost per function for a project with the following information domain characteristics. 8

Number of user inputs: 27

Number of user outputs: 43

Number of user inquiries: 5

Number of files: 4

Number of external interfaces: 2

and Effort = 37 PM, Technical document=360 pages, user document = 129 pages, cost= Rs 200 per month  
complexity adjustment values are 4,1,1,3,5,5,4,4,3,3,2,3,4,5

- a) Discuss Software Risks with its types. Differentiate between proactive and reactive risk handling strategies. 8

- b) Why is SQA needed? Discuss how SQA activities are carried out to help software quality. 7

- a) Define baseline and mention its significance with necessary figure. Explain the importance of change control and version control in software technology. 8

- b) Describe the concept of data modeling. Why data modelling is required in software development process? 7

4. Pokhara University library allows students to take many books and same book can be issued to many students. The librarian checks for overdue books and charges a fine Rs 5 per day if it crosses the deadline. From this scenario :
- Obtain Level -I DFD
  - Draw ER Diagram
  - Use Case Diagram
5. Write down the steps to calculate the cyclomatic complexity of the graph.
- for  $i=1; i < n1 \&\& i <= n2; i++$
- ```

    {
        if(n1%i == 0 \&\& n2%i == 0)
            gcd = i;
    }

    printf("G.C.D of %d and %d is %d, n1,n2, gcd);

```
6. a) What is the significance of abstraction in Object Oriented Programming? Explain different types of Abstraction and also other important features of object-oriented System.
- b) Why software design is important? Explain Modularity, Control Hierarchy and information hiding in software design process.
7. Write short notes on: (Any two)
- Design Patterns
  - White-Box Testing and Black-Box Testing
  - Data Dictionary

## POKHARA UNIVERSITY

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamentals

Semester: Fall

Year : 2022  
Full Marks: 100  
Pass Marks: 45  
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.*

8. a) At what conditions would you choose Rapid application development process model? Explain RAD model in details. 7
- b) Given data for a web-based social networking site developed by ABC software developers:
- Number of User Input = 97
  - Number of Output = 52
  - Number of inquiries = 48
  - Number of External interfaces = 30
  - Number of logical files = 60
- Assuming that the complexity of the given website developed is complex, compute the function point. If the productivity of the ABC s/w developers is 32 FP/P-M and their salary structure is Rs.13000 per months, estimate total cost of the software. 8
8. a) Define Risk. What are its types? Explain. 7
- b) Define software quality. How do you ensure the quality in software being developed? 7
8. a) What is SCM? Explain the importance of configuration audit and status reporting while configuration management. 8
- b) What do you mean by software requirement elicitation? Discuss Facilitated Application Specification Techniques for requirement elicitation. 7
8. a) What is data modeling? Explain E-R diagram with suitable example. 7
- b) What is architectural design of software? Explain different architectural styles in brief. 7

5. a) Differentiate between Black Box Testing and White Box Testing.  
b) Explain control structure testing in details.
6. a) Explain the transformation of Object Oriented Analysis Model in Object Oriented Design Mode.  
b) Explain different layers of object oriented design.
7. Write short notes on: (Any two)  
a) Formal Technical Review  
b) Cyclomatic Complexity  
c) Software Design Concepts

Level: Bachelor  
Programme: BE

**POKHARA UNIVERSITY**

Semester: Spring

Course: Software Engineering Fundamentals

Year : 2023

Full Marks: 100

Pass Marks: 45

Time : 3hrs.

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The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Why do you need a process model to be followed in order to develop software? Explain spiral model with suitable diagram. 7
- b) Write down the demerits of Lines of Code (LOC). The estimated line of code developed by ABC Company is 33,200 and average productivity of company is 620 LOC/PM. If labour rate is Rs. 8000 /PM. From this information calculate
  - i. Cost per line of code
  - ii. Estimated project cost
  - iii. Estimated labour effort8
2. a) What are some technical risks in software project? Explain how risk table helps to minimize the software risk. 7
- b) What do you mean by Quality of Conformance and Quality of Design? Explain about the important guidelines for conducting FTR 8
3. a) What are the test cases? Give the different way to design test cases. Are they related to system testing? Justify your answer. 8
- b) Explain the important features of object oriented software projects. Why do we prefer object oriented software systems? 7
4. a) Define DFD. Obtain level-1 DFD from the given scenario:  
Suppose you are given the details of a small mail order catalogue system that allows people to shop from home. When a customer receives the catalogue and wants to buy something, they can telephone, fax or email their order to the company. The company gets the order and sends the goods and an invoice. When the customer receives the goods with a delivery note, they send payment and receive a receipt for their payment. 8

- b) Explain the use of data dictionary and purpose of SRS? 7

5. a) Differentiate between Object Oriented Analysis (OOA) and Object Oriented Design (OOD). Describe how OOA model is transformed to OOD model. 8

- b) What do you mean by functional independence? Differentiate between Coupling and Cohesion. 7

6. a) What are software configuration items and object. Explain how we can identify software configuration object while developing software. 7

- b) What are alpha and beta testing? Calculate the Cyclomatic Complexity of following code. 8

```
int main()
{
    for(int i = 0; i<=10; i++)
    {
        printf("Inside the Loop\n");
    }
    printf("Outside the loop\n");
    printf("Thank you!!!");
    return 0;
}
```

7. Write short notes on: (Any two) 2x5

- a) Software Myths
- b) Structured Programming
- c) Design Pattern