

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.

1. a) Can evolutionary 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.
2. 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
3. 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
4. a) Obtain a level-1 DFD and design data dictionary for any one data from the given scenario. 8
A travel agency arrange holidays for customer. Booking are made directly by customers. When a customer makes an approach, the

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? 7
5. a) What is software design? Explain different elements of design model. 8
- b) Explain basis path testing? Compute cyclomatic complexity from given piece of program. 7


```

      large = x[0];
      for (i=1, i<=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) 2×5
 - a) White Box Testing & Black Box Testing
 - b) Data dictionary
 - c) Transform Mapping versus Transaction Mapping

POKHARA UNIVERSITY

Level: Bachelor
Semester: Spring
Programme: BE
Course: Software Engineering Fundamentals

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.

1. a) 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
2. a) "If you do not actively attack the risk, the risk will attack you", Justify your statement. Differentiate between predictable and unpredictable risks. 7
b) Explain software reliability? Explain the guidelines for conducting formal technical review (FTR). 8
3. a) What do you mean by ISO standards for software? Explain format approaches to SQA (Software Quality Assurance). 7
b) What is the role of a baseline and SCI's in SCM process? Explain SCM process with necessary diagram. 8
4. a) Obtain a level 1DFD 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

- contact no.
- b) Define software prototyping and software specification review. 7
Explain various elements of analysis model.
5. a) Explain the characteristics of object-oriented system with example. 7
b) What do you mean by data design in software design process? Explain 8
component level design.
6. a) Find the cyclomatic complexity $V(G)$ for the following code. 6
- ```

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 4  
testing.
- c) What do you mean by domain analysis? What are the different 5  
components of object oriented analysis model?
7. Write short notes on: (Any two) 2×5
- a) Version Control & Change Control  
b) Integration Testing  
c) System Design Process



## POKHARA UNIVERSITY

|                                           |                |                 |
|-------------------------------------------|----------------|-----------------|
| Level: Bachelor                           | Semester: Fall | Year : 2017     |
| Programme: BE                             |                | Full Marks: 100 |
| Course: Software Engineering Fundamentals |                | 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.*

1. a) Is it mandatory to follow any software process model while developing software? Justify. What is the role of people in software? 7  
b) 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
2. a) "Adding People to a late software project makes it later". Identify the risk and develop a Risk Information Sheet. 8  
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
3. a) Assume that you are the manager of a project. What baselines would you define for the project and how would you control them? 7  
b) What models are created during the analysis phase of a software development process? Explain in brief. 8
4. a) Do you design software when you write a program? What makes software design different from coding? 7  
b) Define the terms classes, inheritance and polymorphism. Describe the concept of information hiding with respect to software design in your own words. 8
5. a) Illustrate "Object Oriented Paradigm as a new concept in Software" with appropriate example. 7  
b) Define Cyclomatic Complexity. Using Basis path testing approach 8

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

```
int a=1,b=1,n,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? 7
- b) "Don't rush through it! Design is worth the effort." Justify the statement with some design principle. 8
7. Write short notes on: (Any two) 2x5
  - a) Cardinality and Modality
  - b) ISO Standard
  - c) Design Patterns



## POKHARA UNIVERSITY

|                                           |                  |                 |
|-------------------------------------------|------------------|-----------------|
| Level: Bachelor                           | Semester: Spring | Year : 2017     |
| Programme: BE                             |                  | Full Marks: 100 |
| Course: Software Engineering Fundamentals |                  | 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.***

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: 8  
**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? 7
- b) What do you mean by Analysis modeling? What is its importance? Explain the Elements of analysis model. 8
4. a) 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? 7  
b) Discuss validation and verification in testing. Explain Control structure testing. 8
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? 7  
b) What do you understand by Domain Analysis? What are the different steps involved in it? 8
7. Write short notes on: (Any two) 2×5  
a) Design pattern  
b) Version control  
c) Cost of Quality



## POKHARA UNIVERSITY

Level: Bachelor

Semester: Fall

Year : 2018

Programme: BE

Full Marks: 100

Course: Software Engineering Fundamentals

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.*

1. a) 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
2. 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
3. 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
4. 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
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. 7
6. a) What are the different stages of risk mitigation and planning? 7  
Explain the role of risk exposure in risk prioritization.
- b) 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? 8
7. Write short notes on: (Any two) 2×5
- a) COCOMO Model
  - b) Data dictionary
  - c) Boundary Value Analysis

## POKHARA UNIVERSITY

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamental

Semester: Spring

Year : 2018  
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.*

1. a) Define software metrics collection process. Explain each step in brief. 7  
b) Given data for a AI based social networking site developed by ABC 8  
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.
2. a) What is formal technical review? 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 of 8  
configuration audit and status reporting while configuration management.  
b) Define Cyclomatic Complexity. Using Basic path testing approach 7  
draw the flow graph and find the Cyclomatic Complexity for the following code.

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



```

else
y=y-x;
}
return x;
}

```

4. a) What is software architecture? Why is it important? Explain, data centered architecture with necessary diagram. 8
- b) Prepare level 1 DFD for the following doctor appointment system. 7  
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. 8
- b) What do you mean by domain analysis? Explain domain analysis process. 7
6. a) What do you mean by inheritance, encapsulation and polymorphism? Explain how objects interact with each other using messages. 8
- b) Differentiate between object oriented an analysis and object oriented design. 7
7. Write short notes on: (Any two) 2×5
  - a) SCRUM process -
  - b) Cost of quality
  - c) Functional Independence

**POKHARA UNIVERSITY**

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamentals

Semester: Fall

Year : 2019  
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.*

1. a) What are the attributes of good software? Explain RAD model. 7  
b) Calculate the function point value for a project with the following 8  
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.
2. a) Why it is necessary to estimate the project? Define software risk and 7  
explain how you manage them.  
b) Define Formal Technical Review. What are the steps of FTR? Explain 8  
how do you conduct FTR.
3. a) What do you mean by SQA? Explain Statistical quality assurance with 7  
example.  
b) What is software quality standard for a software? Explain the steps of 8  
ISO certification.
4. a) What is SCM? Explain the role of baseline and SCI in SCM process with 8  
necessary diagram.  
b) What is analysis modelling? How can requirement specification be 7  
helpful in software development process? Differentiate between data  
and functional modelling.
5. a) Explain software design process and principles. 8

- 
- b) Define Test case. Differentiate white box testing and black box testing with examples. 7
6. a) What do you mean by domain analysis in OOAD? Different between OOA and OOD. 7
- b) Explain OOA process with the help of necessary diagram. 8
7. Write short notes on: (Any two) 2×5
- a) ISO quality Standards
- b) Control Structure Testing
- c) Design Patterns



## POKHARA UNIVERSITY

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamentals

Semester: Spring

Year : 2019  
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.*

1. 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? 7
- 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. 8
2. a) Define software quality assurance (SQA). Explain formal technical review with its importance in software development and list out the steps to conduct FTR. 8
- b) What do you mean by SCM? Explain the importance of configuration audit and status reporting in SCM. 7
3. a) What are the elements of analysis model? Explain each element in brief. 7
- b) What do you mean by design model? List any six design principles. Explain Data-flow architecture. 8
4. a) Design a Level 1 DFD for a Food Ordering System. Include following requirements in your design. 8
  - 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. 7
5. a) What are the importance of validation testing? Define cyclomatic complexity. Draw flow graph and find the cyclomatic complexity of the following code: 8

```

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? 7
6. a) Differentiate between object oriented analysis and object oriented design. Explain the importance of domain analysis in OOAD. 8
- b) What do you mean by design patterns? Explain the importance of object oriented analysis and design in software development. 7
7. Write short notes on: (Any two) 2x5
- a) Software process and process models
  - b) Statistical Quality Assurance
  - c) 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 : 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 process and describe at least two process models based on evolutionary approach with recommendations to use them in different scenario. 8  
b) Given data for a social networking site developed by PU software developers: 7  
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.
2. 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. 8  
b) What do you mean by SQA? Explain statistical quality assurance with an example. 7
3. a) What do you mean by SCM? Explain the importance of configuration audit and status reporting in SCM. 7  
b) What is Requirements Analysis in software engineering? Explain some elements of analysis model. 8
4. a) What do you mean by design model? List any six design principles. Explain call and return architecture. 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=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. 8
- i) Derive Use Cases from the above scenario and model them into a Use Case Diagram.

**POKHARA UNIVERSITY**

Level: Bachelor

Semester: Fall

Year : 2021

Programme: BE

Full Marks: 100

Course: Software Engineering Fundamentals

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.*

1. 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
2. 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
3. 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
4. a) Differentiate between Transform mapping versus transaction mapping. 7  
b) Define Software Testing. Differentiate between black-box testing and white-box testing. 8
5. 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. 8
6. a) Explain the translation of OOA model to OOD Model. 7  
b) Explain rapid application development model with its pros and cons. 8
7. Write short notes on: (Any two) 2x5 =  
a) Requirement Elicitation  
b) Software reliability  
c) Design Pattern



## POKHARA UNIVERSITY

Level: Bachelor      Semester: Spring      Year : 2021  
Programme: BE      Full Marks: 100  
Course: Software Engineering Fundamentals      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.*

1. 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
2. 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
3. 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 : 15
- a) Obtain Level -1 DFD
  - b) Draw ER Diagram
  - c) Use Case Diagram
5. Write down the steps to calculate the cyclomatic complexity of the graph. 15
- Calculate the cyclomatic complexity of following snippet
- ```
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? 7
- 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. 8
7. Write short notes on: (Any two) 2×5
- a) Design Patterns
 - b) White-Box Testing and Black-Box Testing
 - c) 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.

1. 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: 8
 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.
2. a) Define Risk. What are its types? Explain. 8
b) Define software quality. How do you ensure the quality in software being developed? 7
3. 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
4. a) What is data modeling? Explain E-R diagram with suitable example. 8
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. 7
b) Explain control structure testing in details. 8
6. a) Explain the transformation of Object Oriented Analysis Model in Object Oriented Design Mode. 7
b) **Explain** different layers of object oriented design. 8
7. Write short notes on: (Any two) 2×5
a) Formal Technical Review
b) Cyclomatic Complexity
c) Software Design Concepts

POKHARA UNIVERSITY

Level: Bachelor

Semester: Fall

Year : 2023

Programme: BE

Full Marks: 100

Course: Software Engineering Fundamentals

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.

1. a) Why it is mandatory to follow software process model while developing software? Which type of model do you suggest for developing a project whose requirements are not clearly provided by client? Provide reasons to support your answer. 7
b) Briefly discuss the concept of metrics in software engineering. 8
A hospital management system is to be developed, and the estimated lines of code (LOC) are calculated to be 75,000. Based on historical data for health domain projects, the average productivity is 450 LOC per person-month (PM), and the labour rate is Rs. 25,000 per month. Calculate the estimated effort and estimated project cost for the development of the hospital management system.
2. a) "If you do not actively attack risk, the risk will attack you" justify. Explain different categories of risk associated with software projects. 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
3. a) Why Version control is required? Discuss "configuration audit is important during software development process". 8
b) What is analysis modeling? How requirement specification be helpful in software development Process? Discuss about data, function and behavior modelling. 7
4. a) The system should enable the staff of each academic department to examine the course offered by their department, add and remove course, and change the information about them (e.g. the maximum number of students). It should permit students to examine currently available courses, add and drop courses to and from their schedules, and examine the course for which they are enrolled. Department staff 7

should be able to print a variety of reports about the courses and the students enrolled in them. The system should ensure that no student takes too many courses and that students who have any unpaid fees are not permitted to register. (Assume that a fees data store is maintained by the university's financial office that the registration system accesses but does not change). Draw a context diagram and level-1 data flow diagram for the above course Registration system.

- b) List out any three qualities of a good design. Explain the concepts of: 8
 - i. Data centered architecture.
 - ii. Call and return architecture.
5. a) What do you mean by Boundary Value analysis Testing? Consider 8
the problem for the determination of the nature of roots of quadratic equation. Its inputs are triple of positive integers (say a, b and c) and value may be from interval [0,100]. The output may have one of the following words: [Not a quadratic equation; real roots; imaginary roots; Equal roots] Identify the Boundary value analysis test cases.
- b) Draw the control flow graph and calculate the cyclomatic complexity 7
of the following function.

```

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

```
6. a) What is Object Oriented Programming? What are the four pillars of 8
OOP? Explain.
- b) Describe the transformation from object oriented analysis to design 7
with diagram.
7. Write short notes on: (Any two) 2×5
 - a) Cohesion and coupling
 - b) RMMM plan
 - c) Design pattern

POKHARA UNIVERSITY

Level: Bachelor

Semester: Spring

Year 2023

Programme: BE

Full Marks: 100

Course: Software Engineering Fundamentals

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.

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 8
 - i. Cost per line of code
 - ii. Estimated project cost
 - iii. Estimated labour effort
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: 8
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.

-
- 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) 2×5
- a) Software Myths
- b) Structured Programming
- c) Design Pattern

POKHARA UNIVERSITY

Level: Bachelor

Semester: Spring

Year : 2024

Programme: BE

Full Marks: 100

Course: Software Engineering Fundamentals

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.

1. a) As a project manager, you need to create a new library management system with a comprehensive list of requirements. The client wants it delivered within three to six months but is open to refining requirements based on initial prototypes. 8
Which software process model would you choose for this project?
Justify your choice highlighting the strengths.
- b) 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: 28
Number of user outputs: 44
Number of user inquiries: 7
Number of files: 3
Number of external interfaces: 2
and Effort=37P-M, Technical document=360 pages, user document=129 pages, cost=Rs 8000 per month complexity adjustment values are 4,1,1,3,5,5,4,4,3,2,3,4,5
2. a) What do you mean by proactive and reactive risk management? 8
Explain any three risk mitigation strategies with examples of how they can be applied in a software development project.
- b) Discuss the key activities involved in SQA and how they contribute to the overall quality of the software product. 7
3. a) What do you mean by baseline discuss in your own word? Explain the importance of configuration audit and status reporting while configuration management. Explain how you control change in project. 7

- b) What is analysis modeling? How can requirement specification be helpful in software development process? Describe data and functional modeling. 8
4. a) What do you mean by a design model? List any four design principles. 7
Explain call and return architecture.
- b) A kathmandu based transport company wants to establish a computerized ticketing counter at Gongabu bus terminal. Company owns both air conditioned as well as non-AC buses. Besides that, company also provides service of goods transport. There are various possible users of the proposed software: Owner can monitor and manipulate the accounts and reservations whereas clients can view the status of their ticket and goods. Employees can have limited access according to their role. Draw a context diagram and Level-1 Data flow diagram for the possible automated system (assume necessary details if needed). 8
5. a) Explain the concept of unit testing and regression testing in software development. Discuss their significance in ensuring software quality. 8
- b) Draw the control flow graph and calculate the cyclomatic complexity of the following function. 7
- ```

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

```
6. a) What is an object oriented paradigm? List out the different elements of an Object model with a suitable example. 7
- b) Describe the transformation from object oriented analysis to design with diagram. 8
7. Write short notes on: (Any two) 2x5
- Cohesion and coupling
  - Version Control
  - Cost of quality