

24 Aug

POKHARA UNIVERSITY

Semester - Fall

Level: Bachelor

Programme: BE

Course: Software Engineering Fundamentals

Year : 2013

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) What is evolutionary software process model? Explain. Also show that as you move outward along the process flow path of an evolutionary model. What can you say about the software that is being developed or maintained? 7
- b) What are the qualities that should be considered while measuring software? Explain Function Point metrics with example. 8
1. a) How might the completion time and costs be estimate for a new software engineering contract? Explain two estimating techniques. 8
- b) What is the purpose of clean room engineering in software quality assurance? Explain in detail 7
3. a) Software requirements analysis is unquestionably the most communication intensive step in the software engineering process. What causes the communication path to break down? Also explain how a system analyst will address the issue of job security in requirement gathering phase due to implementation of an automated software system. List all the possible solutions that will be of help to minimize the problem 8
What do you understand by the term SCM? Which components of software can undergo configuration management? What is the role of a baseline and SCIs in SCM process? Explain with necessary figure. 7
4. a) A program reads three integer values. The three values are interpreted as representing the lengths of sides of triangle. The program prints a message the states whether the triangle is scalene, isosceles or equilateral. Derive a flow graph for the program and apply basis path testing to develop test cases that will guarantee that all the statements in the program have been tested. Execute all the cases and show your 8

1

116

calculations.

- b) What are different software testing strategies? Is unit testing possible or even desirable in all circumstances? Provide examples to justify your answer. 7

5. a) A country Bus Company owns a number of buses. Each bus is allocated to a particular route, although some routes may have several busses. Each route passes through a number of towns. One or more drivers are allocated to each stage of a route, which corresponds to a journey through some or all of the towns on a route. Some of the towns have a garage where busses are kept and each of the busses are identified by the registration number and can carry different numbers of passengers, since the vehicles vary in size and can be single or double-decked. Each route is identified by a route number and information is available on the average number of passengers carried per day for each route. Drivers' have an employee number, name, address, and sometimes a telephone number. 10

I. Identify the entities from the above problem and model it into a ER-diagram

- b) What is object? "Messages are means by which objects interact". Agree or disagree with reason. 5
6. a) Explain the transition from Analysis to Design model with necessary figure. Illustrate all the necessary components of an Analysis model and their equivalent state in the Design model. 8
- b) Explain the Object design process with relevant figures. How design patterns help in a good design? 7

7. Write short notes on any two: 2×5

- a) Partitioning of Analysis Model
b) Granularity in software design
c) Data dictionary.

POKHARA UNIVERSITY,

Prayer for
Pre-SE
Course, software Engineering Fundamentals

Semester: Spring

Year : 2013

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) Why do you need a process model to be followed in order to develop a software? Explain spiral model. 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

सुगम स्टेशनरी सप्लायर्स एण्ड फोटोकपी सर्विस

बालकुमारी, ललितपुर ९८४१५९५९२

NCIT College

- a) What do you mean by Quality of Conformance and Quality of Design? Elaborate the Activities of the SQA Group. 8

- b) "If you do not actively attack the risk, the risk will attack you", Justify your statement. Differentiate between predictable and unpredictable risks. 7

- a) Why is SQA needed? Explain the components of the OO analysis model. 8

- b) Why is Software Designing an important job? Explain Modularity Concept along with the five criteria for effective modular system. 7

4. a) What are analysis model elements? 8

- b) Explain the transform mapping and transaction mapping. How they are related for software? 7

5. a) Differentiate between white-box testing and black box testing. 8

- b) Using Basis path testing approach draw the Flow graph and find out the Cyclomatic complexity of the following code fragment:

If ($x > y$)

Min = xi

Else

Min = yi

End if

6. a) "Message passing is the way through which objects Communicate to each other". Is it true, if then validate your answer.
- b) Describe transformation from OOA model too OOD model.
7. Write short notes on: (Any two)
 - a) Software Requirements Specification (SRS)
 - b) Domain Analysis
 - c) Software Architecture.

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE

Semester: Fall

Course: Software Engineering Fundamentals

Year : 2014

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.

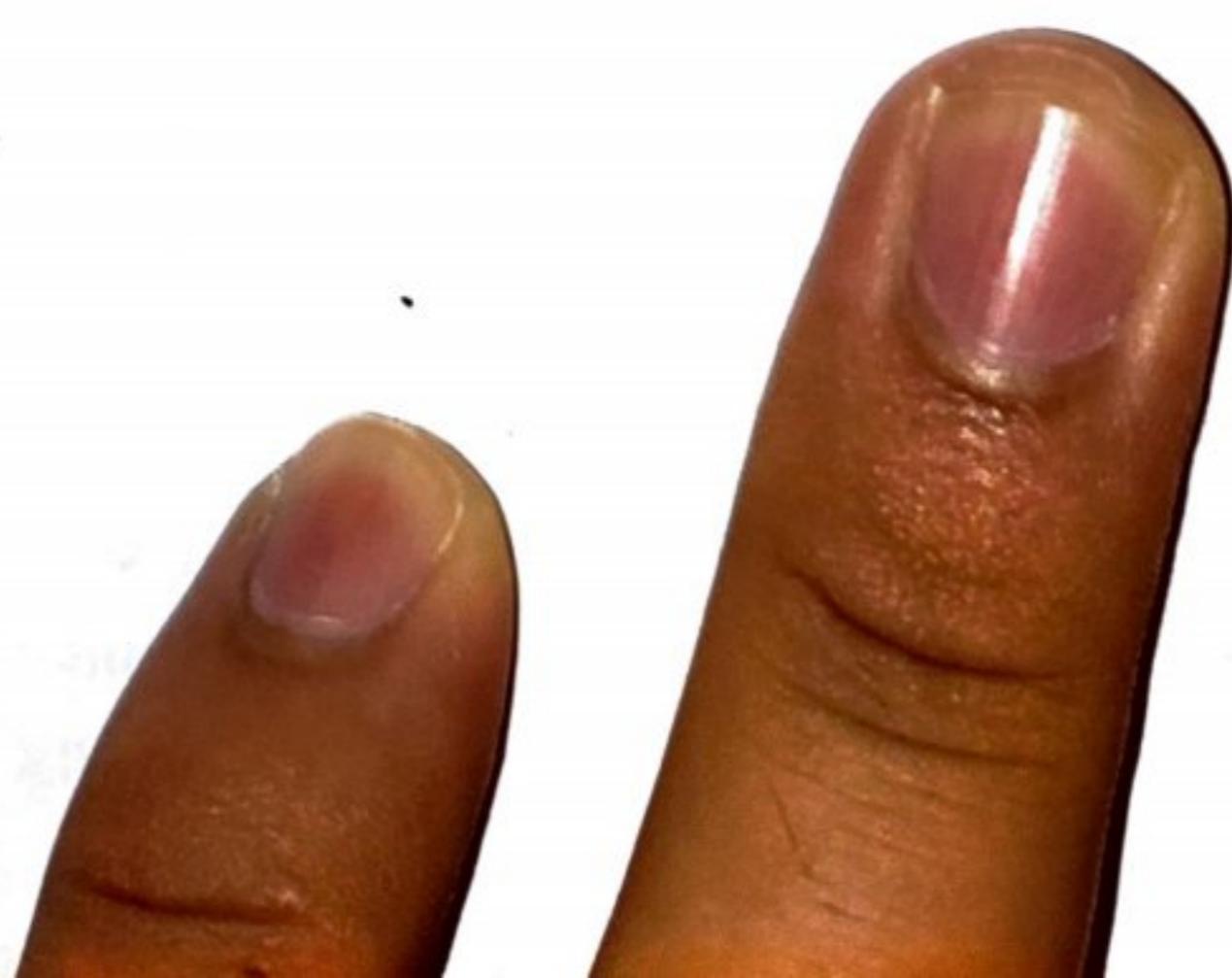
Attempt all the questions.

1. a) List out the characteristics of Software. Explain Component Based Development process highlighting its advantages over conventional approach. 7
- b) How software metrics does helps in enhancing software quality. A MIS system for the college is to be developed in which the estimated lines of codes (LOC) is calculated to be 45,000 and a review of the historical data reveals that the average productivity for this type of system is 350 LOC/pm and the labor rate is Rs. 6,500 per month. What would be the estimated project cost and the estimated effort for this software package? 8
2. a) Define Risk Projection. Describe different risk categories to be considered during software development. 8
- b) Describe cost of quality. How do you perform Formal technical Review? 7
- a) Why is SQA needed? Discuss how SQA activities are carried out to help software quality. 8
- b) What do you mean by version control? Why is configuration audit essential during software development process? 7
4. a) "Analysis starts with data modeling". Describe the concept of data modeling. 8
- b) Explain the transition from Analysis to Design model with necessary figure. Illustrate all the necessary components of an analysis model and their equivalent state in the design model. 7
5. a) What do you mean by system testing? Discuss the different types of system testing. 8

- b) Using Basis path testing approach draw the Flow graph and find out the Cyclomatic complexity of the following code fragment:

```
x=10  
y=5  
z=2  
if x>y and x>z  
max=x  
else if y>z  
max=y  
else max=z
```

6. a) Describe the different characteristics of object oriented program.
b) What are the various components required for object oriented analysis model?
7. Write short notes on: (Any two) 2×
a) ER Diagram
b) Object Oriented Design
c) SRS.



POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Software Engineering Fundamentals

Semester: Spring

Year : 2014
Full Marks: 100
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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 terms people, product, process and project. What do you mean by umbrella activity in software process? 7
- 2x5 b) An Air Line Reservation System is to be developed in which the lines of codes is calculated to be 37,000 and a review of the historic data reveals that the average productivity for this type of system is 500(LOC/pm) and the labor rate is Rs. 8,500 per month. What would be the estimated project cost and the estimated effort for this software package? 8
- a) What are the software risks? Explain different categories of risks associated with software projects. 8
- b) As a 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
- What is the need of SCM activities? Why is Configuration audit essential during software development process? 8
- b) "Analysis starts with data modeling". Describe the concept of data modeling. 7
4. a) Explain the transition from Analysis to Design model with necessary figure. Illustrate all the necessary components of an analysis model and their equivalent state in the design model. 7
- b) Using Basis path testing approach draw the Flow graph and find out the Cyclomatic complexity of the following code fragment: 8
- ```
if {x<10}
print "x is less than 10"
else if x<20
```

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```
print "x is between 10 and 20" Min= yi
else if {x<30}
print "x is between 20 and 30"
else
print "greater than 30"
```

5. 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) Explain the various components required for object oriented analysis model.
6. a) What are the test cases? Give the different way to design test-cases. Are they related to system testing? Justify your answer.
- b) Why is design process important? Briefly explain the different levels of designs?
7. Write short notes on: (Any two)
- Version Control and Change Control.
  - Quality Standard.
  - Facilitated Action Specification Technique.

Level: Bachelor  
programme:  
Course: Soft

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## POKHARA UNIVERSITY

Level: Bachelor  
Programme: BE

Semester: Fall

Course: Software Engineering Fundamentals

Year : 2015

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 is evolutionary software process model? Explain. Also show that as you move outward along the process flow path of an evolutionary model, what can you say about the software that is being developed or maintained? 8
- b) Given data for a Web based social networking site developed by RBN Software Developers: 7

Numbers of User Input : 97

Numbers of User Outputs: 52

Numbers of User Inquiries: 48

Numbers of External Interfaces: 30

Numbers of Logical Files: 60

Assuming that the complexity of the given website development is average, compute the function point. If the productivity of the RBN S/W Developers is 32FP/P-M, and their salary structure is Rs.13000 per months on average, estimate total cost of the software.

2. a) What do you understand by the term SCM? Which components of software can undergo configuration management? What is the role of a baseline and SCIs in SCM process? Explain with necessary figure. 8

- b) Quality and reliability are related concepts but are fundamentally different in a number of ways. Discuss them. 7

3. a) A Country Bus Company owns a number of busses. Each bus is allocated to a particular route, although some routes may have several busses. Each route passes through a number of towns. One or more drivers are allocated to each stage of a route, which corresponds to a journey through some or all of the towns on a route. Some of the towns have a garage where busses are kept and each of the busses are identified by the registration number and can carry different numbers of passengers, since

the vehicles vary in size and can be single or double-decked. Each route is identified by a route number and information is available on the average number of passengers carried per day for each route. Drivers have an employee number, address and sometimes a telephone number.

- i. Identify the entities from the above problem and model it into a ER-diagram.

- b) What do you mean by dynamic estimation model? Is "Software Equation" a dynamic estimation model? Justify your answer.
4. a) Consider the following piece of program, which assumes a large integer C and an array A [0 .. C]. It is intended to assign the maximum of A to the variable max.

```
Max = A [0];
I = 1;
While (I < C) {
 I = I + 1;
 If (A [I] > Max)
 {
 Max = A [I];
 }
}
```

For the above program design a test case and recommend a testing technique. Justify your recommendation.

- b) What are the various types of software risks? Discuss risk mitigation strategies.
5. a) Explain why encapsulation, inheritance, and polymorphism are three important characteristics of object-oriented systems.
- b) How do you identify the elements of an object oriented model? Discuss about the generic steps that a software engineer should perform during object oriented design.
6. a) Differentiate between white-box testing and black box testing. What are the attributes of good test? Explain.
- b) Explain the translation of OOA model to OOD model.
7. Write short notes on: (Any two)
- Data dictionary.
  - Design Notations.
  - Granularity in software design.

Level: Bachelor  
Programme: F  
Course: Soft

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**POKHARA UNIVERSITY**

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamentals

Semester: Spring

Year : 2015  
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.*

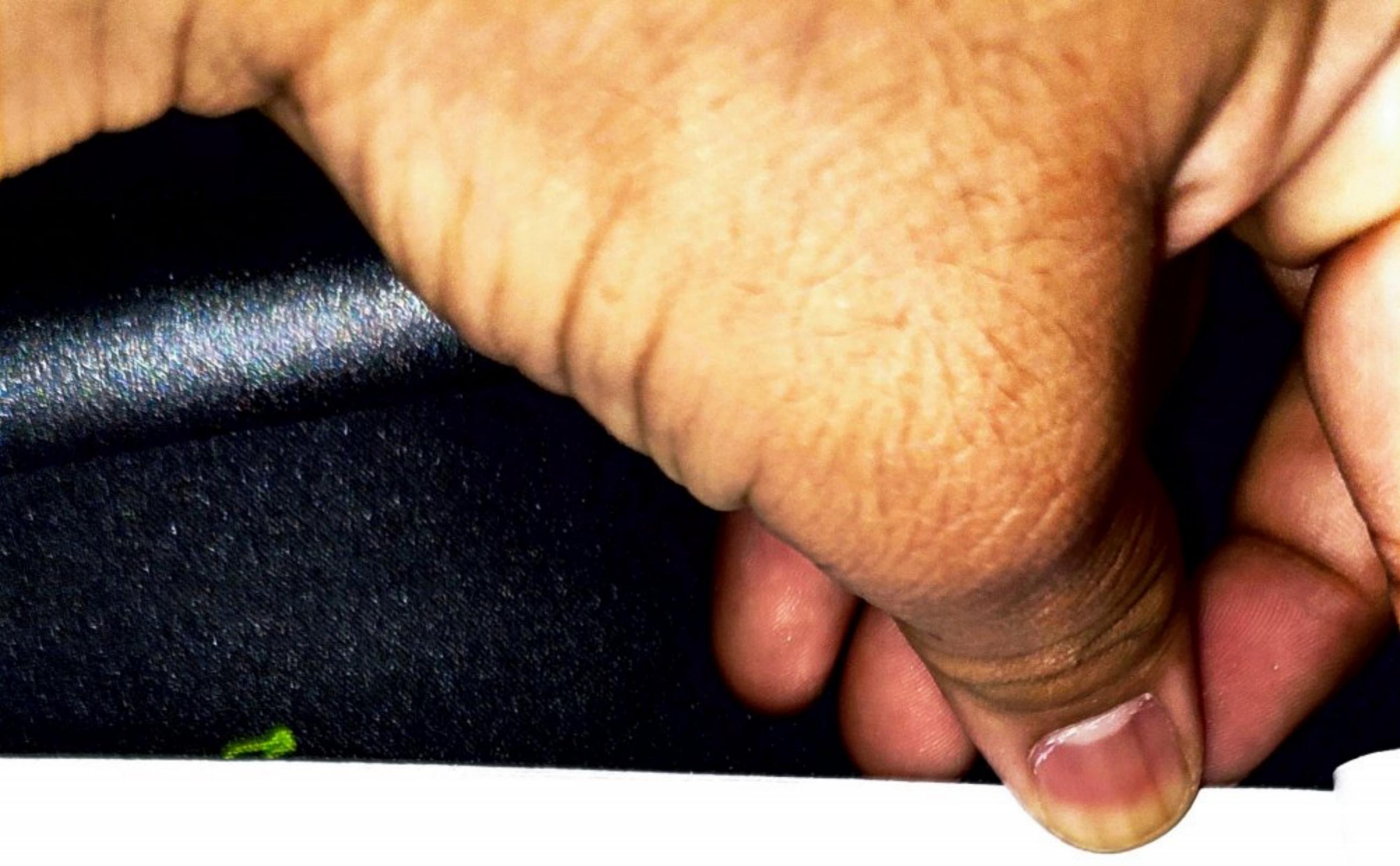
1. a) What are the characteristics of software? Which model would you use for risk driven software development? Explain. 8  
b) What are metrics, measures and indicators? Compute the function point value for a project with the following information domain characteristics :

|                            |      |
|----------------------------|------|
| No. of user inputs         | : 39 |
| No. of user outputs        | : 53 |
| No. of user inquiries      | : 30 |
| No. of files               | : 12 |
| No. of external interfaces | : 5  |

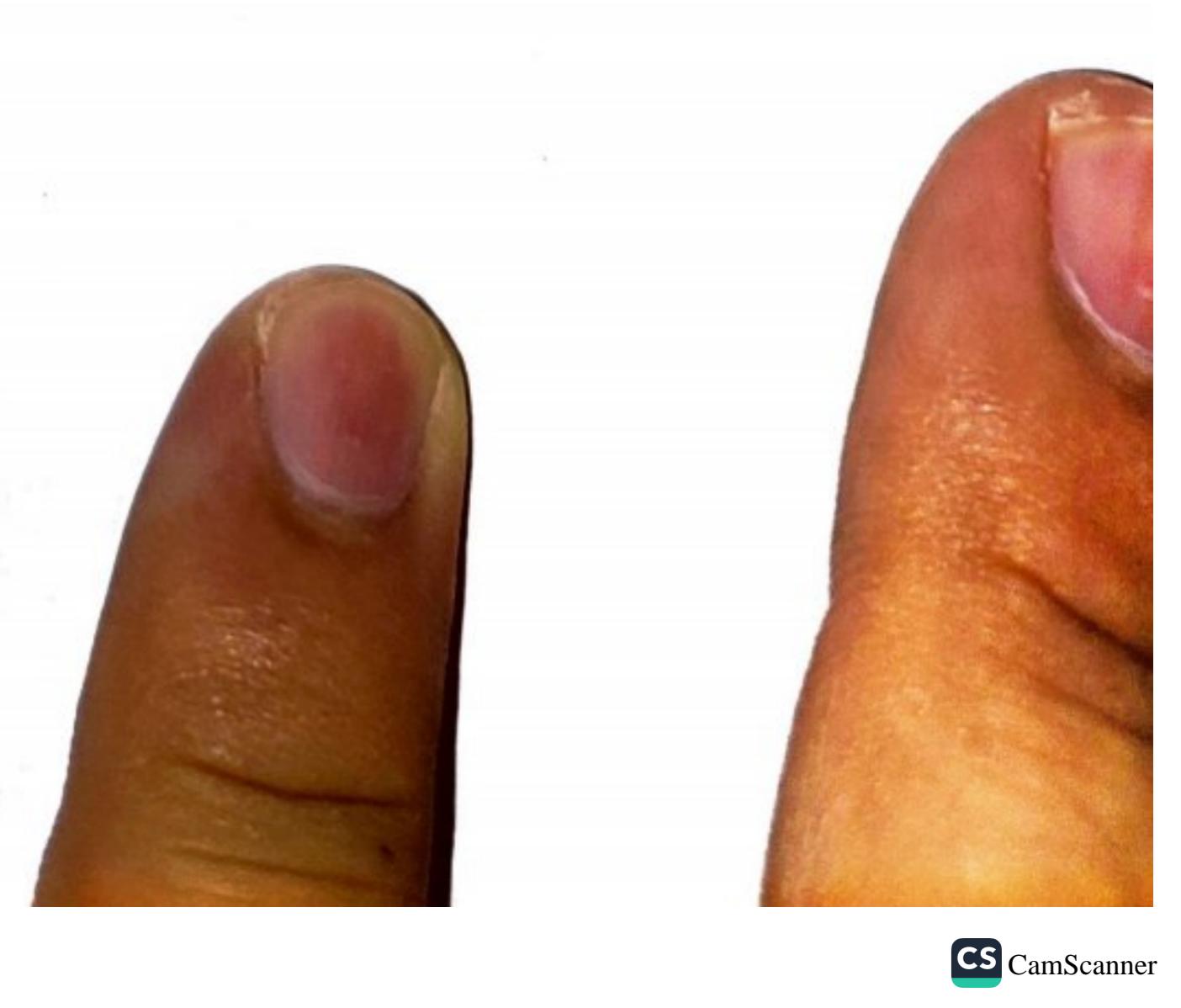
सुगम स्टेशनरी सञ्चारसंगठन फोटोकपी सेवा  
बालकुमारी, ललितपुर ९८४३५९९५९२  
NCIT College

Assume that the complexity adjustment values are average.

2. a) Discuss, with respect to a software project, the need for risk analysis and management and the steps involved in this activity. 7  
b) Why are software reviews important? What are the guidelines for conducting FTR? 8
3. a) What do you mean by version control? Explain the steps involved. 8  
Why is configuration audit essential during software development process?
- b) What do you mean by Analysis modeling? What is its importance? 7  
Explain the Elements of analysis model.
4. a) What is a software design? Why are design principles important in software design? Explain the design principles. 8  
b) Why is software testing an integral part of software development? 7  
Explain the significance of white box testing and black box testing during SDLC.



5. a) Discuss the importance of software architecture. What is Transform mapping? Explain each step involved in Transform mapping. 7
- b) Explain about the Boundary Value Analysis and Equivalence partitioning in software 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? 8
- b) How do you identify the elements of an object oriented model? Discuss about the generic steps that a software engineer should perform during object oriented design. 7
7. Write short notes on: (Any two) 2x5
- a) Cost of Quality
  - b) Verification and Validation
  - c) RMMM plan

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5. a) Discuss the importance of software architecture. What is Transform mapping? Explain each step involved in Transform mapping.  
b) Explain about the Boundary Value Analysis and Equivalence partitioning in software 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) How do you identify the elements of an object oriented model? Discuss about the generic steps that a software engineer should perform during object oriented design.
7. Write short notes on: (Any two)
- a) Cost of Quality
  - b) Verification and Validation
  - c) RMM plan

**POKHARA UNIVERSITY**

Level: Bachelor  
Programme: BE

Semester: Fall

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) 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.

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
- 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];
}
```

- 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

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  
Programme: BE

Course: Software Engineering Fundamentals

Semester: Spring

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 8  
Prototyping Model with Spiral Model giving a suitable example.
- b) Compute the function point value for a project with the following 7  
information domain characteristics.  
Number of user input: 32  
Number of user output: 60  
Number of user inquiries: 24  
Number of files: 8  
Number of external interface: 2
- a) "If you do not actively attack the risk, the risk will attack you", Justify 7  
your statement. Differentiate between predictable and unpredictable  
risks.
- b) Explain software reliability? Explain the guidelines for conducting 8  
formal technical review (FTR).
- a) What do you mean by ISO standards for software? Explain format 7  
approaches to SQA (Software Quality Assurance).
- b) What is the role of a baseline and SCI's in SCM process? Explain 8  
SCM process with necessary diagram.
- a) Obtain a level 1DFD and design data dictionary from any one data 8  
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

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) 2x5
- a) Version Control & Change Control
  - b) Integration Testing
  - c) System Design Process

**POKHARA UNIVERSITY**

Level: Bachelor  
Programme: BE

Semester: Fall

Course: Software Engineering Fundamentals

Year : 2017

Full Marks: 100

Pass Marks: 45

Time : 3hrs.

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

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**Attempt all the questions.**

- 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
- 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
- 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
- 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
- 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 1.
- 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 2
- a) Cardinality and Modality
  - b) ISO Standard
  - c) Design Patterns

**POKHARA UNIVERSITY**

Level: Bachelor

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Course: Software Engineering Fundamentals

Semester: Spring

Year : 2017

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 is a software engineering paradigm? Discuss the RAD model, 8  
stating its advantages and disadvantages.
- b) What are the disadvantages of LOC based Estimation. Explain the 7  
function Point Metric of Software Project Estimation.

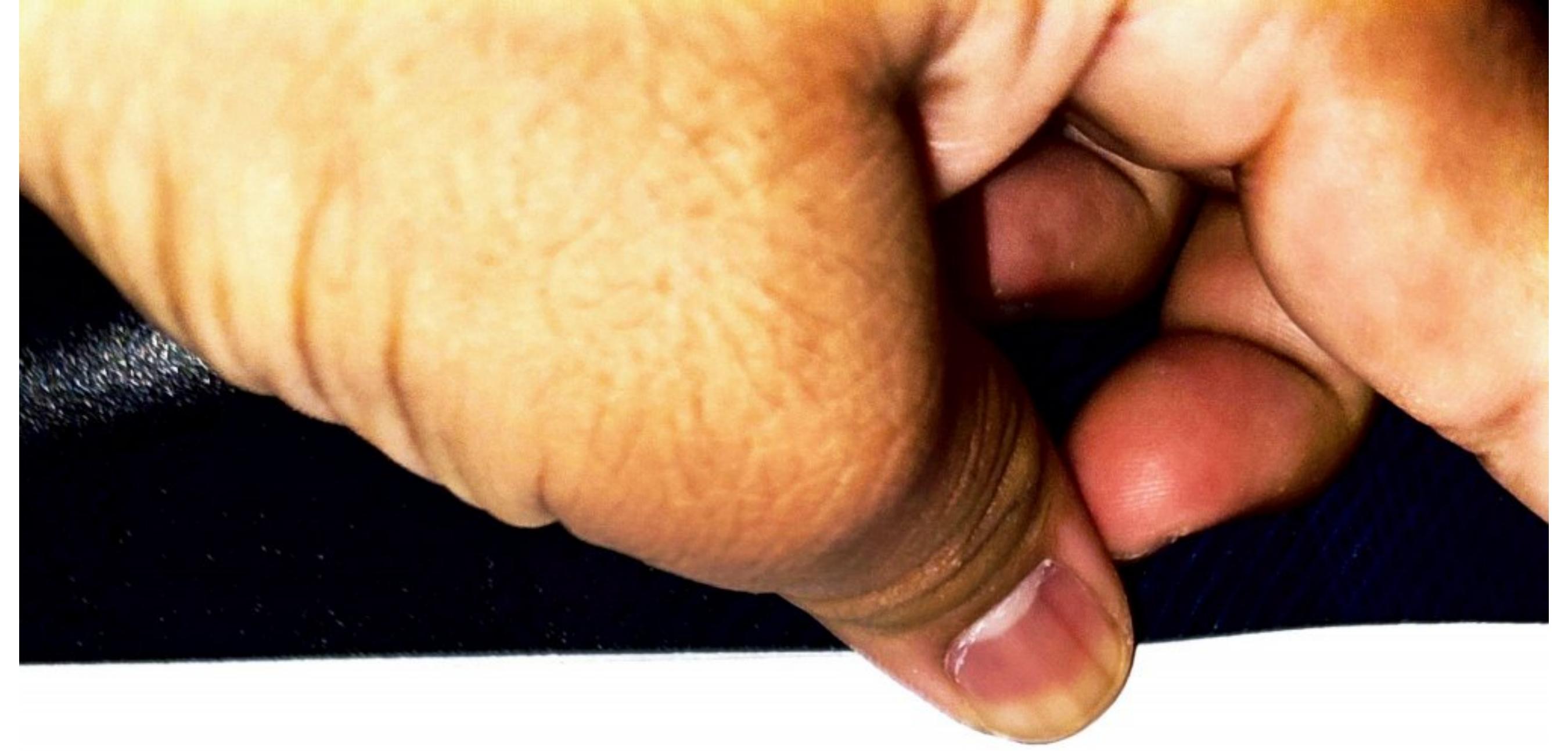
- 5 2. a) Why risk analysis is done? Assume that software team defines a 8  
project risk in as follows:

**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 7  
conducting FTR?
- a) What is "configuration audit" and "status reporting"? How it aids in 7  
software configuration management?
- b) What do you mean by Analysis modeling? What is its importance? 8  
Explain the Elements of analysis model.
- a) Define software design. Explain architectural and component level 8  
design.
- b) Explain the purpose of black box and white box testing. Why do we 7  
need validation testing?

- 
5. a) Explain the use of data dictionary and purpose of SRS? 7  
b) Discuss validation and verification in testing. Explain Control 8
- structure testing.
6. a) What do you mean by object-oriented paradigm? What are the steps in 7  
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 8  
steps involved in it?
7. Write short notes on: (Any two) 2
- a) Design pattern
- b) Version control
- c) Cost of Quality

**POKHARA UNIVERSITY**

Semester: Fall

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamentals

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) 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
1. a) Discuss about objectives, constraints, process and results of Formal Technical review. 8
- b) What are the different metrices used for different software life-cycle stages, respectively? Discuss. 7
1. 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
1. 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. 7
6. a) What are the different stages of risk mitigation and planning? Explain the role of risk exposure in risk prioritization. 7
- 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

Semester: Spring

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamental

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.

- 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 company: 8

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;
}
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. 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 cancellation 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 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 analysis and object oriented design. 7

7. Write short notes on: (Any two)

- a) SCRUM process .
- b) Cost of quality
- c) Functional Independence

2×5

```
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. 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. 12. 2
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) 2x5
- 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.

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

- 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

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POKHARA UNIVERSITY

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamentals

Semester: Spring

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

2: 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? 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
- 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
1. 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. 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) 2×5

- a) Software process and process models
- b) Statistical Quality Assurance
- c) Functional Modeling and behavioural modeling

# POKHARA UNIVERSITY

Semester: Fall

Level: Bachelor  
Programme: BE  
Course: Software Engineering Fundamentals

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.

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.

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

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

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.

```
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. If 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 are 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)

2×5

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

7

8

8

**POKHARA UNIVERSITY**

Semester - Spring

Year: 2020

Full Marks: 70

Pass Marks: 31.5

Time: 2 hrs.

Level: Bachelor  
Program: BE  
Course: Software Engineering Fundamentals

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)**

1. 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
2. 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

3. 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.

What is Cyclomatic Complexity?

Explain How to calculate Cyclomatic Complexity using Independent Path Basis.

1.5+1  
5+3+  
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.

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.

4+6

### 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). 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

6+6+  
8

a. Use-case diagram for the system.

b. ER-Diagram for this system

c. Context diagram and Level-1 Data flow diagram

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: B.P.  
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.*

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.
- 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
- 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 :

- 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.  
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?  
· 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)

- a) Design Patterns
- b) White-Box Testing and Black-Box Testing
- c) Data Dictionary

7

8

2x

# 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) 2x3  
a) Formal Technical Review  
b) Cyclomatic Complexity  
c) Software Design Concepts