

# CBCS SCHEME

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21CS61

## Sixth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Software Engineering and Project Management

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. What are seven broad categories of computer software? (10 Marks)
- b. What are the elements of a software process, generic process framework? (10 Marks)

OR

- 2 a. List the types of prescriptive process models and explain waterfall model and incremental process models. (10 Marks)
- b. Explain spiral model and concurrent models. (10 Marks)

### Module-2

- 3 a. Define requirements engineering and explain seven different tasks of requirements engineering. (10 Marks)
- b. Draw and explain UMC use case diagram for SafeHome home security function. (10 Marks)

OR

- 4 a. Identify different ways of requirements model. Explain scenario based. (10 Marks)
- b. Draw and explain activity diagram for access camera surveillance via the internet display camera views function. (10 Marks)

### Module-3

- 5 a. Explain 12 agility principles to achieve agility. (10 Marks)
- b. Explain SCRUM and FDD. (10 Marks)

OR

- 6 a. Explain Core Principles. (10 Marks)
- b. Explain Construction principles. (10 Marks)

### Module-4

- 7 a. Explain activities covered in software project management. (10 Marks)
- b. Explain ways of categorizing software projects. (10 Marks)

OR

- 8 a. Explain Project charter. (10 Marks)
- b. Explain setting objectives. (10 Marks)

### Module-5

- 9 a. Explain place of software quality in project planning. (10 Marks)
- b. Explain Boehm's model. (10 Marks)

OR

- 10 a. Explain V – Process Model. (10 Marks)
- b. Explain software Reliability. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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21CS62

**Sixth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025**

## **Full Stack Development**

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### **Module-1**

- 1 a. Explain the processing of Django request and response with a flow diagram. (10 Marks)
- b. Write a python function in Django framework that displays date and time which is an offset of n hours from current date and time. (10 Marks)

**OR**

- 2 a. Illustrate the process of URL mapping with views. (10 Marks)
- b. Describe MVC design pattern with a neat diagram. (10 Marks)

### **Module-2**

- 3 a. Define the following: (i) Tags (ii) Filters (10 Marks)
- b. Describe the process of template system usage in Django. (10 Marks)

**OR**

- 4 a. Explain the following:  
(i) Selecting objects  
(ii) Deleting objects (10 Marks)
- b. Summarize the concept of template loading in Django. (10 Marks)

### **Module-3**

- 5 a. Illustrate the usage of admin interface in Django. (10 Marks)
- b. Develop a Model form for student that contains his topic chosen for project, languages used and duration with a model called project. (10 Marks)

**OR**

- 6 a. Describe the following:  
(i) Creating a feedback form  
(ii) Processing the submission (10 Marks)
- b. Create a Django app that performs student registration course. Register admin interfaces, perform migrations and illustrate data entry through admin forms. (10 Marks)

### **Module-4**

- 7 a. Develop a Django app that performs CSV and pdf generation for any models created. (10 Marks)
- b. Illustrate the generic views of objects. (10 Marks)

**OR**

- 8 a. Create a generic class view which displays list of students and detail view that displays student details for any selected student in the list. (10 Marks)
- b. Explain the syndication feed framework in generating Non-HTML content. (10 Marks)

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**Module-5**

- 9 a. Define the following: (i) HTML (ii) XML (iii) JSON (iv) CSS  
b. Mention the jQuery Ajax facilities and explain any four.

(10 Marks)

(10 Marks)

**OR**

- 10 a. Illustrate the using of jQuery UI Autocomplete in Django templates.  
b. Explain XML HTTP Request by mentioning the properties.

(10 Marks)

(10 Marks)

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21CS63

## Sixth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Computer Graphics and Fundamentals of Image Processing

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain any five of the applications of computer graphics. (06 Marks)
- b. Develop the Bresenham's line drawing algorithm. Apply this algorithm for the line end points (20, 10) and (30, 18), list the points and plot the resultant line in x-y plane. (09 Marks)
- c. Explain OpenGL point and line functions with examples. (05 Marks)

OR

- 2 a. Explain the raster scan with neat diagram. Explain the role of the graphic controller. (06 Marks)
- b. Explain OpenGL functions to draw point, line and polygon objects in 2D. Develop the code snippet for drawing object star shape in 2D. (09 Marks)
- c. Illustrate the display window management using GLUT with diagram. (05 Marks)

### Module-2

- 3 a. Explain the equation and matrix representation for a 2D object translation and rotation about the origin with the neat diagram. (08 Marks)
- b. With neat diagram, explain the 3D translation of a point and extend the same for 3D object. Write the equations for each vertex and matrix representation. (10 Marks)
- c. Justify the need of homogeneous coordinates. (02 Marks)

OR

- 4 a. Explain with the diagram the 3D object rotations and scaling. Give the matrix representations of the object. (08 Marks)
- b. Illustrate with neat diagram, the five steps sequence of transformations for rotating an 3D object about an axis parallel to the x-axis. (10 Marks)
- c. Define 2D reflection and shear. (02 Marks)

### Module-3

- 5 a. Explain the LOCATOR, STROKE, VALUATOR, CHOICE and STRING Logical Input Devices. (08 Marks)
- b. Explain the basic approach to the design of animation sequences. (07 Marks)
- c. Explain the GLUT mouse functions with a program snippet. (05 Marks)

OR

- 6 a. Explain any three interactive picture-construction techniques with necessary diagram. (08 Marks)
- b. Explain the traditional animation techniques with bouncing-ball illustration. (07 Marks)
- c. Explain the GLUT keyboard functions with a program snippet. (05 Marks)

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**Module-4**

- 7 a. Explain image processing and its related fields in detail. (10 Marks)  
b. Define pixel, resolution and its bit-depth of an image. Explain the digital image representation in the computer system with neat diagram. (08 Marks)  
c. An image of size 2.5 inches by 2 inches is scanned at 150 dpi. Determine the number of pixels in the image. (02 Marks)

**OR**

- 8 a. Explain the fundamental steps in image processing with diagram. (07 Marks)  
b. Explain the following terms or concepts with suitable examples with respect to pixels in an image:  
(i) Neighbourhood (ii) Connectivity (iii) Relations (11 Marks)  
c. Consider a  $375 \times 300$  grey-scale image needs to be sent across the channel of capacity 28 Kbps, then determine the transmission time required. (02 Marks)

**Module-5**

- 9 a. Define image segmentation. Explain the classification of the segmentation algorithms. (10 Marks)  
b. Explain the following grey level discontinuities in a digital image:  
(i) Point detection (ii) Line detection (10 Marks)

**OR**

- 10 a. Explain edge detection and different stages in edge detection process. (10 Marks)  
b. Explain the following:  
(i) Sobel operator (ii) Canny edge detection (10 Marks)

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21CS642

## Sixth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Advanced Java Programming

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. What are enumerations? How to use enum constructor, instance variable and method? Explain with an example. (08 Marks)
- b. Explain how to obtain all annotations associated with a class and a method with a example. (08 Marks)
- c. Explain the various typewrappers used in java. (04 Marks)

**OR**

- 2 a. Explain the following with respect to annotations :
  - (i) Single member Annotations (08 Marks)
  - (ii) Default values in annotations. (06 Marks)
- b. What is autoboxing? Write a java program that demonstrates autoboxing and unboxing occurs inside expressions. (06 Marks)
- c. What are Annotations? Explain the following built-in annotations with examples :
  - (i) @Override (06 Marks)
  - (ii) @Target
  - (iii) @SuppressWarnings

### Module-2

- 3 a. What are generics? Why Generics are required? Develop a simple program to show the concept of generics. (08 Marks)
- b. What are Bounded types? Demonstrate the use of bounded types with example program. (06 Marks)
- c. Describe Overriding methods in a generic class. (06 Marks)

**OR**

- 4 a. Why wild cards are required in Generics? Explain with an example program. (08 Marks)
- b. What is type Erasure? Describe Bridge methods with code snippet. (06 Marks)
- c. Explain Generic Super Class and Generic Sub Class with code Snippet. (06 Marks)

### Module-3

- 5 a. Explain the string comparison methods with suitable examples. (08 Marks)
- b. Explain various string constructors in java with example. (04 Marks)
- c. What is String Buffer? How it is differ from string? Explain any six buffer methods. (08 Marks)

OR

- 6 a. How Compare Toll method differs from Compare To Ignore Case ( ) method? Develop a Java program to sort an array of string in descending order by ignoring case. (08 Marks)
- b. Explain different methods to modify the strings objects by using String Class with an example. (06 Marks)
- c. Describe different character extraction methods with example. (06 Marks)

**Module-4**

- 7 a. What is Servlet? Explain life cycle of Servlets. Differentiate between Servlets and JSP. (07 Marks)
- b. Develop a program using Servlets that contains HTML page to accept Username and address and Display Greeting message as "Hello Username-address, How are you" in the browser window. (07 Marks)
- c. What are Cookies? Explain how Cookies are handled in Servlets? Develop a program to create a Cookie with name "Username" and Cookie value "XYZ". And also, display stored cookie in a web page. (06 Marks)

OR

- 8 a. What is JSP? Explain different JSP tags with example. (07 Marks)
- b. What is Session Object? Develop a program to create and read session object using JSP. (07 Marks)
- c. List and explain core classes and interfaces that are provided in javax.servlet.http package. (06 Marks)

**Module-5**

- 9 a. Describe the various steps of JDBC process with code snippets. (08 Marks)
- b. What is JDBC? Explain the four different types of JDBC drivers. (06 Marks)
- c. What are Transactions? Develop a program to demonstrate how to process a database transaction. (06 Marks)

OR

- 10 a. Briefly explain statement object. Develop a java program to demonstrate execute Query ( ) and executeUpdate ( ) methods. (10 Marks)
- b. What is meta data? Develop a program to display table name, column, count and structure of the table with size and data types. (10 Marks)

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21CS651

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025

## Introduction to Data Structures

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define an array. Explain declaration and initialization of two dimensional array with syntax and example. (08 Marks)
- b. Define a pointer. Explain how pointer variable is declared and initialized. (06 Marks)
- c. Develop a C program using an array to find sum of  $n$  real numbers. (06 Marks)

OR

- 2 a. Differentiate between static and dynamic memory allocations. Discuss four dynamic memory allocation functions with syntax and example. (08 Marks)
- b. Differentiate between structure and union with syntax and example. (06 Marks)
- c. Develop a C program to maintain record of ' $n$ ' students detail using array of structures with four fields (Rno, name, marks, grade). Each field is an appropriate data type. Print the marks of student name is given. (06 Marks)

### Module-2

- 3 a. Define Data structures. Explain the classification of data structures with example. (06 Marks)
- b. Define stack. Write a menu driven C program for the following operations on STACK of integers:
  - i) Push an element on to stack.
  - ii) Pop an element from the stack.
  - iii) Display the contents of stack.
  - iv) Exit.(08 Marks)
- c. Convert the following infix expression into postfix expression using stack:  
$$A + (B * C - (D/E^F) * G) * H$$
(06 Marks)

OR

- 4 a. Define a queue. Write C functions for `qinsert()` and `qdelete()` routines of a queue. (06 Marks)
- b. What is the advantage of circular queue over ordinary queue? Write a C program to simulate the working of circular queue of integers using array. Provide the following operations:
  - i) insert
  - ii) delete
  - iii) Display(08 Marks)
- c. Discuss the following :
  - i) Double ended queue
  - ii) Priority Queue(06 Marks)

### Module-3

- 5 a. What is a linked list? Explain the different types of linked list with neat diagram. (07 Marks)
- b. Write C functions of the following operations on singly linked list:
  - i) Insert a node at the front
  - ii) Delete a node from the end(08 Marks)
- c. With suitable example, discuss self referential structures. (05 Marks)

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OR

- 6 a. Write a C function to perform the following operations on circular singly linked list:  
 i) Insert a node at the end      ii) Delete a node from the front      (08 Marks)  
 b. Briefly explain the applications of linked list.      (07 Marks)  
 c. Write a C function for the concatenation of two single linked lists.      (05 Marks)

**Module-4**

- 7 a. What is a binary tree? With suitable example, define :  
 i) Root node      ii) Ancestors      iii) Descendants      iv) Leaf node      (08 Marks)  
 b. Write C recursive routine to traverse the given binary tree using inorder, preorder and post order.      (06 Marks)  
 c. Given the following traversal, draw a binary tree:  
 Post order : 4, 2, 5, 1, 6, 7, 3, 8  
 Inorder : 4, 5, 2, 6, 7, 8, 3, 1      (06 Marks)

OR

- 8 a. Define binary search tree. Draw the BST for the following input.  
 14, 15, 4, 9, 7, 18, 3, 5, 16, 20, 17      (07 Marks)  
 b. Define an expression tree. Draw a binary tree for the following expression  
 $((6 + (3 - 2) * 5)^2 + 3)$       (07 Marks)  
 c. With suitable examples, explain strictly binary tree and complete binary tree.      (06 Marks)

**Module-5**

- 9 a. Define sorting. Develop a C program to sort a given list of elements in ascending order using the selection sort technique.      (10 Marks)  
 b. Write a C function to implement the bubble sort technique. Apply this function to sort the given elements:  
 77, 33, 44, 11, 88, 22, 65, 55  
 Also, mention its time complexity.      (10 Marks)

OR

- 10 a. Define searching. Develop a C program to search for a given element in a list of elements using the binary search technique.      (08 Marks)  
 b. Write a C function to implement the insertion sort technique. Apply this function to sort the given elements:  
 77, 33, 44, 11, 88, 22, 65, 55  
 Also, mention the time complexity of the algorithm.      (06 Marks)  
 c. Write a C function to implement the linear search technique. Apply this function to find the key element 60 in the following list of elements:  
 10, 20, 30, 40, 50, 60.  
 Also, mention the time complexity of the algorithm.      (06 Marks)

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