# Guru Nanak Dev Engineering College, Ludhiana

## Department of Information Technology

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|---|---|---|---|
| **Program** | B.Tech (IT) | **Semester/ Section** | 4th/ B |
| **Subject Code** | PCIT-106 | **Subject Title** | Operating System |
| **Mid Semester Exam (MSE) No.** | 1st | **Course Coordinator** | Pankaj Bhambri |
| **Max. Marks** | 24 | **Time Duration** | 09.00AM – 10.30AM |
| **Date of MSE** | 14th February 2024 (Wednesday) | **University Roll Number** | |

**Note:** Attempt all questions

| Q. No. | Question | COs, RBT level | Marks |
|---|---|---|---|
| Q1 | Discuss the importance of system calls, processes and threads. | CO1, L2 | 2 |
| Q2 | Appraise and evaluate the significance of Inter Process Communication. | CO1, L5 | 2 |
| Q3 | Distinguish between shell and kernel with two major differences. Analyze the deadlock avoidance and prevention mechanisms alongwith the significance of resource allocation graphs. | CO1, L4 | 4 |
| Q4 | Demonstrate the four criterias required for the process synchronization. How two types of semaphores resolve the issue of process synchronization? Demonstrate through appropriate examples. | CO1, L3 | 4 |
| Q5 | Categories Preemptive and Non-Preemptive Scheduling.<br>There are six processes named as P1, P2, P3, P4, P5 and P6. Their arrival time and burst time are given below in the table. The time quantum of the system is 2 units. Calculate the Average Turn Around Time, Average Waiting Time and Average Response Time using the Round Robin Scheduling. | CO1, L5 | 4 |
| Q6 | a. Compare and contrast the various features, pros/cons and applications of different types of operating systems.<br>b. Classify the operating system services. Evaluate the roles of process control block structure and process states. | CO1, L4<br>CO1, L4 | 8 |

| Process | Arrival Time | Burst Time |
|---|---|---|
| $P_1$ | 0 | 5 |
| $P_2$ | 1 | 6 |
| $P_3$ | 2 | 3 |
| $P_4$ | 3 | 1 |
| $P_5$ | 4 | 3 |
| $P_6$ | 6 | 4 |

**Course Outcomes (CO)**

*Students will be able*

| | |
|---|---|
| 1 | Exemplify various types of Operating Systems, deadlocks, Process, File and Memory management. |
| 2 | Implement various deadlock scheduling algorithms. |
| 3 | Analyze and apply various memory and file management mechanisms. |
| 4 | Classify various page replacement algorithms for demand paging. |
| 5 | Use different disk scheduling algorithm for better utilization of external memory. |
| 6 | Examine the case studies of different Operating Systems to recapitulate the concepts of Operating System. |

| RBT Classification | Lower Order Thinking Levels (LOTS) | | | Higher Order Thinking Levels (HOTS) | | |
|---|---|---|---|---|---|---|
| RBT Level Number | L1 | L2 | L3 | L4 | L5 | L6 |
| RBT Level Name | Remembering | Understanding | Applying | Analyzing | Evaluating | Creating |

**Guru Nanak Dev Engineering College, Ludhiana**

**Department of Information Technology**

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|---|---|---|---|
| **Program** | B.Tech. (IT) | **Semester** | 4th |
| **Subject Code** | PCIT-108 | **Subject Title** | Computer Architecture & Microprocessors |
| **MSE No.** | 1 | **Course Coordinator(s)** | Er. Gitanjali |
| **Max. Marks** | 24 | **Time Duration** | 1 hour 30 minutes |
| **Date of MSE** | 12th Feb 2024 | **Roll Number** | |

**Note:** 1. Attempt all the questions in serial order.

| Q. No. | Question | COs, RBT level | Marks |
|---|---|---|---|
| Q1 | Describe the main purpose of assembly language? What are the advantages of assembly language over machine language? | CO3, L2 | 2 |
| Q2 | A computer register T of 8-bits is having hexadecimal **CB** as its initial value. What will be the value of status bits CY, S, Z , P and AC after adding the immediate operand hexadecimal **E9** to T. | CO1 , L4 | 2 |
| Q3 | With the help of flowchart, Illustrate the different phases of instruction cycle. | CO2, L2 | 4 |
| Q4 | An instruction is stored at location **300** with its address field at location **301**. The address field has the value **400**. A processor register **R1** contains the number **200**. **Evaluate the effective address and operand that must be loaded into accumulator if the addressing mode of the instruction** is:<br>(a) Direct<br>(b) Immediate<br>(c) Relative<br>(d) Register Indirect<br>(e) Index with R1 as the Index register<br>What are different addressing modes? | CO2, L3 | 4 |
| Q5 | Suppose we have input 1st as **84** Hexadecimal number and input 2nd as **75** Hexadecimal number. Using these inputs, write an assembly language program that performs addition operation on the given inputs and show the **output generated is a 16-bit number.** Also provide the complete representation of the hexadecimal inputs into binary form. | CO5, L6 | 4 |
| Q6 | Sketch out the architecture of the 8085 microprocessor. Elucidate the following<br>(a) General purpose and Specific purpose registers, Register pairs<br>(b) Address Buffer , Address/Data Buffer<br>(c) Instruction Decoder<br>(d) Increment/Decrement Address latch<br>(e) Timing and Control Circuitry and its pins<br>(f) ALU<br>(g) Status Flags<br>(h) Interrupt Control and its pins | CO1, L6 | 8 |

**Course Outcomes (CO)** *Students will be able to:*

| | |
|---|---|
| 1 | Identify computer systems, memory organization, Microprocessor and assembly language programming |
| 2 | Clarify instruction formats, RISC and CISC architecture and different addressing modes |
| 3 | Solve basic binary math operations by using the instructions of microprocessor |
| 4 | Compare between pipelining and parallelism |
| 5 | Design structured, well commented, understandable assembly language programs to provide solutions to real world problems |
| 6 | Classify the trends and developments of microprocessor technology |

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| Department of Information Technology | | | |
| **Program** | B.Tech.(IT) | **Semester** | 4 |
| **Subject Code** | PCIT-105 | **Subject Title** | Python Programming |
| **Mid Semester Test (MST) No.** | 1 | **Course Coordinator(s)** | Harpreet Kaur |
| **Max. Marks** | 24 | **Time Duration** | 1 hour 30 minutes |
| **Date of MST** | | **Roll Number** | |

**Note:** Attempt all questions

| Q. No. | Question | COs, RBT level | Marks |
|---|---|---|---|
| Q1 | "Python is Platform Neutral". Comment. | CO1, L2 | 2 |
| Q2 | What are the Immutable data types in Python? | CO1, L2 | 2 |
| Q3 | Write a program to explain the concept of<br>a) isdecimal() , b) isdigit(), c) partition(), d) rfind() String methods. | CO3, L3 | 4 |
| Q4 | Write a program to print the following pattern:<br>4 3 2 1<br>3 2 1<br>2 1<br>1 | CO3, L4 | 4 |
| Q5 | Write a Python program that prints all the numbers from 0 to 9 except 3, 5 and 6. | CO3, L4 | 4 |
| Q6 | 1) Give and Explain the Outputs of following code fragments with input a= -7 and b= 5:<br>a) Print(a/4) and print(a//4) b) Print(~a)<br>c) Print(a>>3) d) Print(a and b)<br><br>2) How to Read and Write into a Text file in Python | CO1,C06 L4 | 8(4+4) |

**Course Outcomes (CO)**

*Students will be able to*

| | |
|---|---|
| 1 | Familiar with Python environment, data types, operators used in Python |
| 2 | Compare and contrast Python with other programming languages.. |
| 3 | Learn the use of control structures and numerous native data types with their methods. |
| 4 | Design user defined functions, modules, and packages. |
| 5 | Investigate and implement Graphical User Interfaces based programming |
| 6 | Create and handle files in Python |
| 7 | Identify the need of object oriented programming features and implement the same to meet real time requirements. |

| **RBT Classification** | **Lower Order Thinking Levels (LOTS)** | | | **Higher Order Thinking Levels (HOTS)** | | |
|---|---|---|---|---|---|---|
| **RBT Level Number** | L1 | L2 | L3 | L4 | L5 | L6 |
| **RBT Level Name** | Remembering | Understanding | Applying | Analyzing | Evaluating | Creating |

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|---|---|---|---|
| **Department of Information Technology** | | | |
| **Program** | B.Tech.(IT) | **Semester** | 4 |
| **Subject Code** | BSIT-101 | **Subject Title** | Probability and Statistics |
| **Mid Semester Test (MST) No.** | 1 | **Course Coordinator(s)** | Rupinder Kaur |
| **Max. Marks** | 24 | **Time Duration** | 1 hour 30 minutes |
| **Date of MST** | 13th Feb, 2024 | **Roll Number** | |

**Note:** Attempt all questions

| Q. No. | Question | COs, RBT level | Marks |
|---|---|---|---|
| Q1 | State Type I and Type II error with suitable example. | CO4, L1 | 2 |
| Q2 | Contrast Primary and Secondary data with four valid points of each. | CO1, L4 | 2 |
| Q3 | **Marks** / **No of students**: Less than 5 (29), Less than 10 (224), Less than 15 (465), Less than 20 (582), Less than 25 (634), Less than 30 (644), Less than 35 (650), Less than 40 (653), Less than 45 (655)<br>**From the following data solve the value of median.** | CO1, L3 | 4 |
| Q4 | Determine first four central moments from the following:<br>Sales: 40-50 \| 50-60 \| 60-70 \| 70-80 \| 80-90<br>No of companies: 10 \| 25 \| 30 \| 23 \| 12 | CO1, L3 | 4 |
| Q5 | **Investigate Karl Pearson's coefficient of skewness from the following data**<br>**Profit (Rs. Lakhs)**: 70-80 \| 80-90 \| 90-100 \| 100-110 \| 110-120 \| 120-130 \| 130-140 \| 140-150<br>**No of Cos**: 12 \| 18 \| 35 \| 42 \| 50 \| 45 \| 30 \| 8 | CO5, L6 | 4 |
| Q6 | A sample analysis of examination results of 500 students were made. It was found that 220 students had failed, 170 had secured a third class, 90 were placed in second class and 20 got a first class. Test are these figures commensurate with the general examination result which is in the ratio of 4:3:2:1 for various categories respectively?<br>(Table value of Chi- Square for 3 d.f at 5% level of significance is 7.81) | CO4, L5 | |

**Course Outcomes (CO)**

*Students will be able to*

| | |
|---|---|
| 1 | Demonstrate the measures of central tendency to analyze the given data set |
| 2 | Create the histogram for a given data set |

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| Guru Nanak Dev Engineering College, Ludhiana | | | |
| Department of Information Technology | | | |
| Program | B.Tech. | Semester | 6 |
| Subject Code | PCIT-104 | Subject Title | Database Management System |
| (MST) No. | 1 | Course Coordinator | Mohanjit Kaur Kang |
| Max. Marks | 24 | Time Duration | 1hr 30 mins |
| Date of MST 15/feb/2024 | | Roll Number | |

Note: Attempt all questions

| Q. No. | Question | COs, RBT level | Marks |
|---|---|---|---|
| Q1 | Define integrity constraints. | CO1, L1 | 2 |
| Q2 | Analyze primary and candidate with appropriate example. | CO1, L4 | 2 |
| Q3 | Identify the schemas in DBMS along with at least four differences between external, logical and physical level schemas. Also explain architecture of DBMS. | CO1, L2,L3 | 4 |
| Q4 | Discuss CODD rule in brief for DBMS. | CO1, L3 | 4 |
| Q5 | Elaborate how Entity Relationship diagram can be effectively applied in DBMS. Draw E-R diagram for online shopping system. | CO2, L4 | 4 |
| Q6 | A) Evaluate Relational Algebra.<br><br>Consider the following relational database schema consisting of the four relation schemas:<br><br>passenger ( pid, pname, pgender, pcity)<br><br>agency ( aid, aname, acity)<br><br>flight (fid, fdate, time, src, dest)<br><br>booking (pid, aid, fid, fdate)<br><br>Answer the following questions using relational algebra queries:<br><br>a) Get the complete details of all flights to New Delhi.<br>b) Get the details about all flights from Chennai to New Delhi.<br>c) Find only the flight numbers for passenger with pid 123 for flights to Chennai before 06/11/2020.<br>d) Find the passenger names for passengers who have bookings on at least one flight.<br><br>B) Analyze and evaluate the four Applications of Spatial and Multimedia Databases. | CO2, L4 | 8 |

| Course Outcomes (CO) *Students will be able to* | |
|---|---|
| 1 | Apply knowledge of database system, No Sql database, data mining and SQL structure. |
| 2 | Identify, formulate database design, Functional dependencies and recovery techniques |
| 3 | Use the techniques, skills and tools such as query handling, normalized relations |
| 4 | Design Physical and object relational database. |
| 5 | Investigate various case studies using NoSql. |
| 6 | Apply the Applications of spatial and multimedia databases for real world. |

| RBT Classification | Lower Order Thinking Levels (LOTS) | | | Higher Order Thinking Levels (HOTS) | | |
|---|---|---|---|---|---|---|
| RBT Level Number | L1 | L2 | L3 | L4 | L5 | L6 |
| RBT Level Name | Remembering | Understanding | Applying | Analyzing | Evaluating | Create |

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| **Department of Information Technology** | | | |
| **Program** | B.Tech.(IT) | **Semester** | 4 |
| **Subject Code** | PCIT-107 | **Subject Title** | Web Technologies |
| **Mid Semester Exam (MSE) No.** | 1 | **Course Coordinator(s)** | Akshay Girdhar, Harjot Kaur Gill |
| **Max. Marks** | 24 | **Time Duration** | 1 hour 30 minutes |
| **Date of MSE** | 19th February 2024 | **Roll Number** | |

**Note:** Attempt all questions. All assumptions must be clearly stated.

| Q. No. | Question | COs, RBT level | Marks |
|---|---|---|---|
| Q1 | Apply CSS to change text color of paragraph as red and heading (H1) as blue of a webpage making use of the concept of classes. | CO2, L3 | 2 |
| Q2 | Differentiate between 'class' and 'id' attributes of HTML elements. | CO2, L2 | 2 |
| Q3 | Convert the below data into Tabular format in HTML and CSS:<br><br>S.No., Language, Mostly used for<br><br>1, HTML, Front End<br><br>2, CSS, Front End<br><br>3, Python, Back End<br><br>[Minimum Expectations: dotted border of red color, horizontal table header- with content aligned at center, caption, cell padding and cell spacing, hoverable table in terms of background color etc.] | CO2, L3 | 4 |
| Q4 | "A tribute page is an overview of someone whom we admire in our life." Create a static tribute webpage using HTML and CSS.<br>[Minimum Expectations: class, id, div, img, ordered and unordered lists etc.] | CO2, L6 | 4 |
| Q5 | Build HTML form that includes various input types and use CSS to style the form elements. | CO2, L3 | 4 |
| Q6 | Develop a simple game using HTML for structure and JavaScript for interactivity. Apply CSS for styling to enhance the visual presentation. | CO2, L6 | 8 |

**Course Outcomes (CO)**

*Students will be able to*

| | |
|---|---|
| 1 | Understand the basic tools required for Web designing and applications |
| 2 | Build HTML5 and CSS3 for designing interactive web pages. |
| 3 | Analyze the basic operations of an AJAX application |
| 4 | Develop an interactive website using jQuery. |
| 5 | Acquire the basic usage of PHP construct and its integration with database for developing web modules like, login module, session authentication |
| 6 | Create and design dynamic web application using contemporary development tools like, MVC framework. |

| **RBT Classification** | **Lower Order Thinking Levels (LOTS)** | | | **Higher Order Thinking Levels (HOTS)** | | |
|---|---|---|---|---|---|---|
| **RBT Level Number** | L1 | L2 | L3 | L4 | L5 | L6 |
| **RBT Level Name** | Remembering | Understanding | Applying | Analyzing | Evaluating | Creating |