

Slip No. : 1

Exam Seat No.: 260412

THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA
S.S. OF MCA-I (CSE)

Examination Day: Thursday Date: 04/05/2023 Year: 2023 Time: 3:00 PM to 6:00 PM
Subject: PYTHON PROGRAMMING (MCA2204)

Maximum Marks: 70

*V.S.
W.O.*
Note:

- i. Write answer of each section in separate answer books.
- ii. This paper contains two sections of 35 marks each.

SECTION-I

Q1 a) Write a Python program to create class MCA-I with attributes like class variable mca, instance variables x1 and y1, instance methods get_value and print_value. [5]

b) Consider the list lst=[14,3,6,34,2,7]. Write the Python program which performs the following operation without using built-in methods.
1) Insert element 15 at beginning of the list.
2) Insert element 5 at end of the list.
3) Delete the element at index position 4.
4) Print all elements in reverse order.

OR

b) Design a GUI for calculator using Tkinter [5]

Q2 Answer the following in brief: [Any Five] [10]

- i. What is tuple in Python? Explain any three built-in tuple methods with example.
- ii. Explain the string operations strip and format in detail with an appropriate example.
- iii. Write a python program that to check if given no is armstrong or no.
- iv. Explain built-in datatypes of python.
- v. What is anonymous function? Explain with a suitable example.
- vi. Illustrate the following Dictionary methods with an example.
a) keys() b) items() c) copy() d) pop()

Q3 Create a module which include function for factorial, fibonacci series, prime number and odd-even list generator. In your program call this module to find factorial, fibonacci series, to check whether no is prime or not, and for given number generate odd and even list upto given no. (Without using inbuilt function) [15]

OR

Q3 Write a python program to generate **result.txt** file which contains total no of male, total no of female, no of participants, no of videos, and no of total emotions as a output. Given **dataset.csv** file which contains Age, Gender, Participant, Video and emotions. Also handle the exception related to files using try and multiple excepts block. Data is given in following format in dataset.csv file. [15]

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Age,Gender,Participant,Video,emotion
22,male,1,1,calmness
22,male,1,2,surprise
22,male,1,3,amusement
22,male,1,4,fear

SECTION-II

Q4 a) Write a python program to append student name to an existing file 'student.txt'. Student name is given by user input. Then display the contents of entire file. [5]

b) Write a python program to know the current working directory and to print all contents of the current directory. What changes we need to make in the program if we wish to display the contents of only 'python' directory available in current directory? [5]

OR

b) Explain operator Overriding with example. [5]

Q5 Answer the following in brief: [Any Five] [10]

i Explain Arbitrary keyword argument with an example.

ii Write a python program to implement isPalindrome() function to check given string is palindrome or no.

iii Write a note on Tkinter widget: Message Box.

iv Explain the else and finally block in exception handling in Python.

v Explain difference between **in & is** operator in Python with an example.

vi Explain Method Overloading in Python

vii Describe the difference between Python **os** and **os.path** modules.

Q6 Design Python GUI for student registration which contains name, PRN, Branch, Semester, and result. Also interface your application with mysql database for storing student data. When user click on submit button, student data will be save in mysql database. [15]

OR

Q6 Write a program for creating a **Bank** class ,which is used to manage the bank account of customers. Class has three methods, **Display()**, **Deposit ()** and **withdraw ()**. **Customer** class is derived from Bank class which override Bank class methods. Deposit method display old balance and new balance after depositing the specified amount. Withdraw method display old balance and new balance after withdrawing. If balance is not enough to withdraw the money, it raise **ArithmetError** and if balance is less than 500rs after withdrawing then it raise **Exception**. And **Display()** method display customer information. [15]

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S. S. M.C.A. - I

Examination

Day: Thursday Date: 11th May 2023 Year: 2022-23 Time: 3:00 to 6:00 pm

SUBJECT: Operating Systems (MCA2203)

MAX MARKS: 70

NOTE:

- Answer to the two sections should be written in separate answer sheet.

SECTION – I

Q1.

Answer any FIVE of the following. Each question carries THREE marks.

- What is a semaphore?
- What is Belady's anomaly?
- What do you mean by thrashing?
- What are conditions for a deadlock to exist?
- What is the role of PCB in Context Switching?
- Discuss Resource allocation graph with respect to deadlock.
- Operating System is resource manager"-Justify this statement with suitable functionality of OS.

Q2. A disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 53. The queue of pending requests, in FIFO order, is 98, 183, 37, 122, 14, 124, 65, 67. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?
 i) SCAN ii) C-LOOK. (5+5)

OR

Consider the following page reference string 1, 2, 3, 4, 5, 2, 6, 7, 3, 2, 4, 1, 7, 1, 4, 3, 2, 3, 4, 7, 1. Compare the number of page faults with frame sizes 3, 4 and 5 with either Least Recently Used or Optimal Page replacement algorithm. (10)

Q3. Write and explain the solution for Reader-Writer classical synchronization problem using monitors. (10)

OR

What is semaphore? Explain its implementation as wait and signal for providing process synchronization? (10)

(P. T. O.)

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~~Q3. b
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S. S. M.C.A. - I

Examination

Day: Thursday Date: 11th May 2023 Year: 2022-23 Time: 3:00 to 6:00 pm

SUBJECT: Operating Systems (MCA2203)

SECTION - II

Q4. Answer any THREE of the followings. Each question carries FIVE marks.

- Differentiate between a physical address and a virtual address.
- Differentiate between Multiprocessing and Multithreading.
- Differentiate between Primitve and Non-primitive scheduling.
- Differentiate Counting Semaphore and Binary Semaphore.

Q5. Assume the following workload in a system:

Process	Arrival Time	Burst Time
P1	5	5
P2	4	6
P3	3	7
P4	1	9
P5	2	2
P6	6	3

Draw a Gnatt chart illustrating the execution of these jobs using Round Robin Scheduling Algorithm and also Calculate the average waiting time and average turnaround time.

(10)

OR

How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail.

(10)

Q6. Given free memory partitions of 100 K, 500 K, 200 K, 300 K, and 600 K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212 K, 417 K, 112 K, and 426 K (in order)?

(10)

OR

Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.

(10)

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Semester: SSMCA-I
Subject: Java Programming
Subject Code: MCA2202

Date: 9th May 2023
Max Marks: 70
Time: 3:00-6:00 pm

Section A

Ques 1. Write a program in Java to multiple two n-dimensional matrices and print the output in matrix form. Use appropriate escape sequences.

(10 marks)

Ques 2. A. Write a Java program that creates three threads. First thread displays "Hello!" every one second, the second thread displays "Wear Mask!" every two seconds and "Use Sanitizer!" every 5 seconds.

OR

Ques 2. B. Write a java program to find the factorial value of the given number using user defined package concept.

(5 marks)

Ques 3. A. Discuss the methods of 'String' and 'StringBuffer' class using appropriate examples.

OR

Ques 3. B. Why would we want to use multiple threads in our application? Why not just stick with the main thread? Use an example to support your explanation.

(10 marks)

Ques 4. A. What is an Interface? Explain with a suitable example, how multiple inheritance is implemented? What are abstract classes?

OR

Ques 4. B. What is a Java Exception and its Types? Explain about try, catch, statements with examples. Demonstrate Nested try statements with an example.

(10 marks)

Section B

Ques 5. Write a java program to find the roots of a quadratic equation and display the types of roots found with their values.

(10 marks)

Ques 6. What is the purpose of the System class? Also explain the wrapper class in detail

(10 marks)

Ques 7. A. What is the difference between the >> and >>> operators? Explain with the help of a program?

OR

(P.T.O.)

Q9.b
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Ques 7. B. Write a java program to create own exception for Negative Value Exception if the user enters negative value **(5 marks)**

Ques 8. Write short notes on any two of the following:

- a) this & super keyword
- b) final & static keyword
- c) nested & inner classes & their uses.
- d) class & object

(10 Marks)

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B.S. MCA - IExaminationDay: SATURDAY Date: 6/5 Year: 2023 Time: 3:00 to 6:00SUBJECT: DATABASE MANAGEMENT SYSTEM (MCA2201)

Note: 1) Answer each section separately.
 2) BT stands for Blooms Taxonomy and CO stands for Course Objectives

SECTION - I

Q1) A. **APPOINTMENT (APP#, D#, P#, T#, ADATE, ATIME, DURATION, STATUS)**

Marks 07
BT/CO [B3B4]
[B6]
[C4]

Where D# - Doctor No., P# - Patient No., T# - treatment type, Status - complete/incomplete . Assume that the Doctor, Patient, Treatment and Patient_History tables are also available. Take the Doctor number and Patient number as input from the user. Write a PL/SQL block which displays the number of times this patient has visited this doctor and also all those treatments of this patient which are still incomplete.

(B)

Explain de-normalization with example.

04 [B2B3]
[C3]

Q2) A. Differentiate (ANY TWO):

08 [B4]
[C3C4]
[C6]

1. Procedures and Functions.
2. Relational Schema and Relational Instance
3. Super Key and Candidate Key
4. Online Redolog and Offline Redolog

B. Give an example of a IS-A relation.

04 [B2B3]
[C2]

Q3) A. For the EMP and DEPT tables, write Relational Algebra for the following:

07 [B4B6]
[C3]

EMP(empno, ename, sal, comm, hiredate, job, mgr, deptno)

DEPT(deptno, dname, loc)

1. Display the empno, ename and sal of employees who are working in the 'SALES' department and are not getting comm.
2. Display the maximum salaries in each department
3. Increase the salaries of all analysts by 15% if they have worked for at least five years.

B. Explain the concept of cursors.

05 [B1B2]
[C3]

OR

Q3) A. For the EMP and DEPT tables, write Relational Algebra for the following:

07 [B4B6]
[C3]

EMP(empno, ename, sal, comm, hiredate, job, mgr, deptno)

DEPT(deptno, dname, loc)

1. Display the empno, ename, sal, loc of employees who are working in the 'ADMIN' dept.
2. Display the average salaries of employees as per the department and within department their designation.
3. Decrease the salaries of all managers by 6% if they are working at 'BOSTON'.

B. Which are the different types of views?

05 [B1B2]
[C4]

SECTION - II

Q4) A. Consider the following FDs. What is closure of $(SSN, Pno)^+$?

02 [B4B5]
[C3]

$SSN \rightarrow Ename$
 $Pno \rightarrow Pname, Ploc$
 $SSN, Pno \rightarrow Hours$

P.T.O.

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E. S. MCA - IExaminationDay: SATURDAY Date: 6/5 Year: 2023 Time: 3:00 to 6:00SUBJECT: DATABASE MANAGEMENT SYSTEM (MCA2201)

- B. Suppose we have the condition that whenever two tuples have the same value for an attribute X, they must have the same value for an attribute Y. Then which of the following will NOT hold? Explain briefly. 02

- 1) $X \rightarrow Y$
- 2) $X \rightarrow XY$
- 3) $Y \rightarrow Y$
- 4) $Y \rightarrow XY$

- C. Let R(A,B,C,D,E,F,G,H,I,J) be a relation with dependency set FDs: 07

- $$\begin{array}{ll} AB \rightarrow C & (1) \\ A \rightarrow DE & (2) \\ B \rightarrow F & (3) \\ F \rightarrow GH & (4) \\ D \rightarrow IJ & (5) \end{array}$$

And decomposition of R is given as,

R1(A, B, C), R2(A, D, E), R3(B, F), R4(F, G, H), R5(D, I, J)

Find the following:

1. Key(s)
2. Normal Form
3. Is the decomposition lossless?
4. Is the decomposition dependency preserving?

- Q5) A. Explain the following: (ANY TWO) 06 [B1B2]
[C1C3]
[C5C6]

1. Relation as in RDBMS
2. Information Rule of Codd
3. Advantages of Concurrency
4. Checkpoints

- B. Draw an E-R Diagram for a Hospital Management System. You should be able to store the doctor, patient, medical tests, prescription, appointments, rooms, etc. details. Mention all your assumptions and convert the diagram to tables. 06 [B3B6]
[C2]

OR

- Q5) A. Explain the following: (ANY TWO) 06 [B1B2]
[C1C3]
[C5C6]

1. DBMS vs. File System
2. Logical Independence Rule of Codd
3. Difference between Serial and Serializable Schedules
4. Tablespaces

- B. Design an E-R diagram for keeping track of your favourite sports team. You should store the matches played, the scores in each match, the players in each match and individual player statistics for each match. 06 [B3B6]
[C2]

- Q6) Write short notes: (Any two) 12 [B1B2]
[C2C3]
[C6]

1. Aggregation in E-R Model
2. Division operation in Relational Algebra
3. 3rd Normal Form
4. Background processes of Oracle

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S. S. of MCA-I Examination

Day: Saturday Date: 13/05/2023 Year: 2022-23 Time: 3:00 to 6:00 pm

Subject: Computational Optimization and Statistical Methods (MCA2209) Total Marks: 70
Note: (i) Answer the sections in separate answer books.
(ii) All questions are of 14 marks.

Q. 1. (a) SECTION - I

Solve the following Liner Programming Problem using Simplex method:

$$\text{Maximize } Z = 3x_1 + 2x_2$$

Subject to the constraints

$$5x_1 + x_2 \leq 10; 4x_1 + 5x_2 \leq 60; x_1, x_2 \geq 0.$$

(b) Define artificial variables. Find the solution of the problem:

$$\text{Minimize } z = 2x_1 + 3x_2$$

Subject to the constraints:

$$2x_1 + x_2 \geq 1; x_1 + 2x_2 \geq 1; x_1, x_2 \geq 0 \text{ using the Big-M method.}$$

(c) Solve the following Linear Programming Problem by using two phase method:

$$\text{Minimize } z = 10x_1 + 3x_2$$

Subject to the constraints:

$$x_1 + 2x_2 \geq 3; x_1 + 4x_2 \geq 4; x_1, x_2 \geq 0.$$

OR

(c) Solve the following Linear Programming Problem by using two phase method:

$$\text{Minimize } z = x_1 + 2x_2$$

Subject to the constraints:

$$2x_1 + x_2 = 4; 3x_1 + 4x_2 \geq 5; x_1 + x_2 \leq 4; x_1, x_2 \geq 0.$$

Q. 2. (a) Explain M/M/1: FIFO/ ∞ Queueing model. Also obtain the difference-differential equations.

5

5

4

OR

(a) Explain M/M/1: FIFO/N Queueing model.

(b) Assume that the trucks with goods are coming in a market yard at the rate of 30 trucks per day and suppose that the inter-arrival time follows an exponential distribution. The time to unload the trucks is assumed to be exponential with an average of 42 minutes. If the market yard can admit 10 trucks at a time, calculate P (the yard is empty) and find the average queue length. Also discuss the case if the unload time increases to 48 minutes.

5

(c) At a one-man barber shop, customers arrive according to the Poisson distribution with a mean arrival rate of 4 per hour and his hair cutting time was exponentially distributed with an average hair-cut taking 12 minutes. There is no restriction in queue length. Calculate the following:

5

(a) Expected time in minutes that a customer has to spend in the queue

(b) Probability that there is at least 5 customers in the system

(c) Percentage of time the barber is idle in 8 hours in day

Q. 3. (a) Solve the following Assignment Problem:

5

	M1	M2	M3	M4	M5
J1	12	15	15	13	14
J2	8	14	11	15	8
J3	15	13	11	11	13
J4	8	12	8	11	10

OR

(a) Solve the following Assignment Problem:

5

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Subject: Computational Optimization and Statistical Methods (MCA2209) Total Marks: 70

	A	B	C	D	E
I	(12)	20	20	18	17
II	20	12	(5)	11	8
III	20	(5)	12	5	9
IV	18	11	(5)	12	10
V	17	(8)	9	10	12

- (b) Find the optimal solution of the following transportation problem using the uv-method. 5

	M1	M2	M3	M4	
F1	3	2	4	1	20
F2	2	4	5	3	15
F3	3	5	2	6	25
F4	4	3	1	4	40
	30	20	25	25	

- (c) Find the basic feasible solution of the following transportation problem: 4

	D ₁	D ₂	D ₃	D ₄	
O ₁	10	5	9	18	7
O ₂	13	9	6	12	9
O ₃	3	2	4	4	18
	5	8	7	14	

SECTION - II

Q.4.

Attempt ANY THREE from the following:

Following are marks obtained by student in mathematics. Find it's Mean, median and mode. 14

Roll No.	1	2	3	4	5	6	7	8	9
Marks	48	65	43	31	57	87	70	60	48

- b. Find the mean for the following data.

0-10	10-20	20-30	30-40	40-50	50-60
5	10	25	30	20	10

- c. Find the standard deviation of the annual salaries of a group of employees given in the following table:

Salaries (in Rs '000)	45	50	55	60	65	70	75
No. of persons	3	5	8	7	9	7	4

- d. From the prices of the shares of X and Y given below, find out which is more stable in value.

X	35	54	52	53	56	55	52	50	51
Y	108	107	105	105	106	107	104	103	104

Q6 . (A)

Do as directed.

a. What will be the sample space when a dice is thrown once? 14b. Write the formula of regression coefficient of Y on X i.e. b_{yx} .

c. Obtain the value of mode from the given value:

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THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

S. S. of MCA-I Examination

Day: Saturday Date: 13/05/2023 Year: 2022-23 Time: 3:00 to 6:00 pm

Subject: Computational Optimization and Statistical Methods (MCA2209) Total Marks: 70

10, 9, 6, 10, 9, 6, 6, 9, 10, 10, 9, 6, 6, 9, 9, 6.

- d. If $b_{yx} = 0.8$ and $r = 0.6$ then find the value of b_{xy} .
e. If standard deviation is 6.48 and mean is 7 then find the value of coefficient of variation.

(B) Attempt ANY THREE from the following:

- a. What is the probability of drawing a spade or king from the pack of 52 cards.
b. Define the following:
(a) Random Experiment (b) Independent Event
(c) Impossible Event (d) Sample space
c. A dice is thrown twice. Find the probability that
(a) Outcome is (2,3) (b) Outcome is an odd number both the times.
d. An urn contains 9 balls, two of which are red, three blue and four black. Three balls are drawn from the urn at random. What is the probability that
(a) three balls are of different colour?
(b) three balls are of same colour?

◆ All The Best ◆