2712M179

Candidate's Seat No : 30028

Integ. M.Sc. Sem.-3 (CS) Examination
Object Oriented Concepts & Prog.
December-2022

Time : 2-30 Hours]

[Max. Marks : 70

Instructions:

- Write both the Sections in the separate answer book.
- Both Sections having equal weightage.
- Draw Diagrams wherever necessary.
- Make Assumptions wherever necessary.

SECTION – I

Q-1 Explain the following terms with an appropriate example: 11
1. List the operators that cannot be overloaded. (1 Marks)
2. What is inline function?
3. What is the use of scope resolution operator(::)?
4. Define the significance of public and protected members of the class?
5. Can we have multiple destructors in class? Give reason for your answer.
6. What do you mean by default argument in function?

Q-2 Attempt the following :   12
1. Differentiate Procedural Programming v/s Object-Oriented Programming.
2. List out different datatypes in C++. Explain each in brief.
3. How template class store internally for different datatypes?

OR

Q-2 Attempt the following :
1. What is template? How to define class with multiple datatypes using template? Explain with an example.
2. Write a note on formatted IO stream.
3. What is Function Overloading? Why we require it.

Q-3 Attempt the following : (Any Three)   12
1. What is static data member? How static data members works?
2. What is MIL? How we can initialize the object using MIL? Also mention the advantage of MIL.
3. What is operator overloading? How to overload binary operator?
4. What is copy constructor? Why it required? Write syntax and example to implement copy constructor.

(P.T.O)

SECTION – II

Q-4   **Answer the following.**   11
1. What is the use of ios::trunc I/O Mode? (1 Mark)
2. Is it possible to create user defined manipulator? If No give reason. If yes write Syntax.
3. What is pure virtual function? Why we require it?
4. What is namespace? Write a Syntax to create user defined namespace?
5. Does namespace introduce any overhead? Give reason for your answer.
6. List out the advantages of inheritance?

Q-5   **Attempt the following: (Any Three)**   12
1. What is inheritance? List out the type of Inheritance? Also explain derivation using different access modifier.
2. Why we require to overload the operator using friend? Also write an example for the same.
3. Explain the different features of object-oriented programming.
4. Write down different file handling functions in C++ with its brief description and syntax.

Q-6   **Attempt the following: (Any Three)**   12
1. What is multiple Inheritance and discuss the problem with the multiple inheritance and explain the solution to that problem?
2. What do you mean by overloading a template function? How we can overload function template in C++.
3. Write down the difference between ios functions and manipulators.
4. Explain the components of Standard Template Library.

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3012M396   Candidate's Seat No : 30028

Integ M.Sc Sem.-3 (CS) Examination
Open Source Software

Time : 3-00 Hours]   December-2022   [Max. Marks : 35

Instructions:
- Draw Diagrams wherever necessary.
- Make Assumptions wherever necessary.

Q-1	List Linux commands to perform the followings (Any 7): a. Display online users at current time b. Display the active processes c. Display the calendar of current month d. Find the time since system was booted e. Display last 10 lines of any file f. Display help for grep command g. Change from normal user to root user. h. Display the content of a file.	7
Q-2	Attempt the following : 1) What is command line arguments? How will you use it in Linux? 2) Explain the use of octal notation in "chmod" command. OR	7
Q-2	Attempt the following : 1) What is command substitution? How will you use it in shell scripting? Give 2 examples of command substitution. 2) Discuss "grep" & "wc" commands with 2 examples for each.	
Q-3	Attempt the following : 1) What do you understand by "open source software", state 2 benefits of open source software. 2) What do you understand by Linux Flavors? List any 4 flavors of Linux OS OR	7
Q-3	Attempt the following: 1) State the licenses used for open source software. Give examples of any 4 open source software that are widely used. 2) Discuss the history of Linux OS.	

P.T.o

M 396.2

Q-4	Attempt the following :	7
	1) Write a shell program to add numbers from 1 to 50 (ie. 1+2+3+4+5+.... 49+50)	
	2) Give an example of shell script that uses "case" structure.	
	OR	
Q-4	Attempt the following:	
	1) Write a shell script which asks the user to enter any two numbers, further multiply both the numbers and subtract the sum of the numbers from the product. (ie. (a*b) – (a+b))	
	2) Discuss the syntax of "if" in shell scripting. Give an example of a shell script that uses "if" statement with files.	
Q-5	Predict & Explain the output for following commands:	7
	1) who | grep "Amar"	
	2) ls –a	
	3) ps | wc –l	
	4) head myfile.txt	
	5) chmod u+a myfile.txt	
	6) uname –a	
	7) cat /etc/passwd | tail	

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Integ. M.Sc. Sem.-3 (CS) Examination
Statistical Foundations
December-2022

Time : 2-30 Hours]   [Max. Marks : 70

Instructions:

- Write both the Sections in the separate answer book.
- Both Sections have equal weightage
- Make Assumptions wherever necessary

SECTION - I

Q.1   Answer the following: (11)

a)   A student can enter a course either as a beginner or as a transferring   (1)
student. It is found that 62% of beginners eventually graduate, and that
78% of transferring students eventually graduate. Are the events 'beginner
student' and 'transferring student' independent, mutually exclusive or
dependent?

b)   For these situations, state which measure of central tendency—mean,   (6)
median, or mode—should be used.
1.   The most typical case is desired.
2.   The distribution is symmetric.
3.   There is an extreme value in the data set.
4.   The data are categorical.
5.   Further statistical computations will be needed.
6.   The values are to be divided into two equal groups, one containing
the large values and one containing the small values.

c)   What is an outlier? How can outliers be determined in a dataset?   (4)

Q.2a)   A simple random sample of five men is chosen from a large population of   (6)
men, and their heights are measured. The five heights (in inches) are
65.51, 72.30, 68.31, 67.05, and 70.68. Find the sample mean and standard
deviation.

Q.2 b)   The number of total vetoes exercised by the past 20 Presidents is listed   (6)
below. Use the data to construct a grouped frequency distribution and a
cumulative frequency distribution with 5 classes. What is challenging about
this set of data?

| 44 | 39 | 37 | 21 | 31 | 170 | 44 | 635 | 30 | 78 |
| 42 | 6 | 250 | 43 | 10 | 82 | 50 | 181 | 66 | 37 |

OR

Q.2   The following values of fracture stress (in megapascals) were measured for   (12)
a sample of 24 mixtures of hot-mixed asphalt (HMA).

| 30 | 75 | 79 | 80 | 80 | 105 | 126 | 138 | 149 | 179 | 179 | 191 |
| 223 | 232 | 232 | 236 | 240 | 242 | 245 | 247 | 254 | 274 | 384 | 470 |

Compute mode, median, first quartiles, third quartiles, range, IQR

P.T.o

Q. 3   Attempt any two   (12)

a)   In a process that manufactures aluminium cans, the probability that a can
     has a flaw on its side is 0.02, the probability that a can has a flaw on the
     top is 0.03, and the probability that a can has a flaw on both the side and
     the top is 0.01.
     i) What is the probability that a randomly chosen can has a flaw?
     ii) What is the probability that it has no flaw?
     iii) What is the probability that a can has a flaw on the top but not on the
     side?

b)   Of the microprocessors manufactured by a certain process, 20% are
     defective. Five microprocessors are chosen at random. Assume they
     function independently.
     i) What is the probability that they all work?
     ii) What is the probability that all are defective?
     iii) What is the probability that at least one of the microprocessors works?

c)   Customers who purchase a certain make of car can order an engine in any
     of three sizes. Of all cars sold, 45% have the smallest engine, 35% have the
     medium-sized one, and 20% have the largest. Of cars with the smallest
     engine, 10% fail an emissions test within two years of purchase, while 12%
     of those with the medium size and 15% of those with the largest engine
     fail.
     i) What is the probability that a randomly chosen car will fail an emissions
     test within two years?
     ii) A record for a failed emissions test is chosen at random. What is the
     probability that it is for a car with a small engine?

SECTION - II

Q. 4   Answer the following: (11)

a)   A quality engineer wants to inspect rolls of wallpaper to obtain information   (2)
     on the rate at which flaws in the printing are occurring. She decides to
     draw a sample of 50 rolls of wallpaper from a day's production. Each hour
     for 5 hours, she takes the 10 most recently produced rolls and counts the
     number of flaws on each. What is the sampling method used in this case?

b)   State the most appropriate null hypothesis regarding the population mean: (2)
     A new type of battery will be installed in heart pacemakers if it can be
     shown to have a mean life- time greater than eight years.

c)   What is the hypothesis for ANOVA?   (2)

d)   What is the meaning of degrees of freedom (df)? Where do we use it?   (2)

e)   Mention any three properties of normal distribution.   (3)

Q.5a)   A certain industrial process is brought down for recalibration whenever the   (6)
        quality of the items produced falls below specifications. Let X represent the
        number of times the process is recalibrated during a week, and assume
        that X has the following probability mass function.

X	0	1	2	3	4
P(X)	0.35	0.25	0.20	0.15	0.05

Find the mean, variance and standard deviation of X

M 105-3

Q.5b) Lifetimes of batteries in a certain application are normally distributed with mean 50 hours and standard deviation 5 hours. Find the probability that a randomly chosen battery lasts between 42 and 52 hours. (6)

OR

Q.5a) A survey from Teenage Research Unlimited (Northbrook, Illinois) found that 30% of teenage consumers receive their spending money from part-time jobs.If 5 teenagersare selected at random, find the probability that at 3 of them will have part-time jobs. (6)

Q.5 b) A scale is to be calibrated by weighing a 1000 g test weight 60 times. The 60 scale readings have mean 1000.6 g and standard deviation 2 g. Find the P -value for testing Ho : μ = 1000 versus Ha : $\mu \neq$ 1000.Take $\alpha = 0.05$ (6)

Q. 6 Attempt any one (12)

a) What is meant by a type I error? A type II error? Give examples of each. What is level of signifincane?

b) Perform test of independence addresses the question of whether the coffee preference (light, regular, or dark) is independent of the gender of the coffee drinker (male, female). Take $\alpha = 0.05$

		Coffee Preference			
		Light	Regular	Dark	Total
Gender	Male	20	40	20	80
	Female	30	30	10	70
	Total	50	70	30	150

Integ. M.Sc. Sem.-3 (CS) Examination
Data base Mgmt Systems-II

Time : 2-30 Hours]   December-2022   [Max. Marks : 70

Instructions: Draw Diagrams wherever necessary.
Make Assumptions wherever necessary.

SECTION – I

Q-1 Explain the following terms with an appropriate example: 15
- a. ACID
- b. Pipelined Evaluation
- c. Parallel Database *
- d. System Catalog
- e. Checkpoint

Q-2 Attempt the following :   12
- a. Explain steps in Query Processing with diagram and appropriate query   6
  example
- b. Discuss the simple techniques used to develop algorithms for each operator   6

OR

Attempt the following :
Q-2
- a. Discuss the Anomalies due to Interleaved Transactions   12
- b. Discuss Query Optimization with diagram   6
                                                                                      6

Q-3 Attempt the following :   8
- a. Compare: Dense Index and Sparse Index.   4
- c. Define a. Phantom problem b. Lost Update   4

OR

Q-3 Attempt the following: 8
- a. Explain different Fragmentation techniques for Distributed Databases.   4
- b. Define a. On the fly Evaluation b. Equivalence of expression   4

SECTION – II

Q-4 Explain the following Terms with an appropriate example.   15
- a. CLR
- b. Latches and convoy
- c. Blind write
- d. Fuzzy Checkpoint
- e. CNF

Q-5 Attempt the following: 12
- a. Define: Access Control. Explain Mandatory Access Control with   6
  example.
- b. Explain ARIES recovery algorithm with all the three phases   6

OR

Q-5 Attempt the following: 12
- a. Discuss Transaction Management with reference to Bell-Lapadula   6
  protocol.
- b. Discuss Thomas Write Rule in detail   6

Q-6 Attempt the following: 8
- a. Explain Strict 2PL with appropriate examples   4
- b. Explain deferred update and immediate update recovery techniques.   4

OR

Q-6 Attempt the following: 8
- a. Write advantages, problems and applications of Optimistic Concurrency   4
  Control.
- b. Explain : Shared Nothing Architecture with diagram   4

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