FYCS

A.T.K.T

Exam Oct

2024-25

SEM-II

D.B.J. College, Chiplun
FYCS ATKT Sem-II Exam. Oct-24
Design & Analysis of Algorithms
Date:- 03/10/2024

FY CS
3/10/24

Time: - 2 hr. 30 min. Marks: -75

N.B. 1) All questions shall be compulsory with internal choice within the questions.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q.1 Attempt any four. 20

a) Define algorithm. List and explain types of analysis of algorithms.
b) State and explain the asymptotic notations used in analysis of algorithms.
c) Write a python program to find min & max elements in a 1-d array.
d) What is polynomial? Explain representation of polynomial equation using array.
e) Define data structure. Explain stack data structures in detail.
f) Write a python 2-d array program for displaying addition of two matrices

Q.2 Attempt any four. 20

a) Compare Linear Search and Binary Search technique.
b) Explain selection sort technique in detail.
c) Write a python program to sort an element of list by using bubble sort algorithm.
d) What is the Fibonacci sequence and how does it work using recursion? Explain.
e) Elaborate recursion method.
f) What is Brute Force Method? Explain their comparative analysis.

Q.3 Attempt any four. 20

a) Explain various types of classifications/design criteria and design techniques.
b) What is the concept of Divide-n-Conquer method? Explain its applications.
c) Describe the concept of backtracking programming? Explain its applications.
d) List and explain advantages and disadvantages of greedy methods.
e) Write a python program for merge sort problem.
f) Explain implementation longest Common sub sequence problem using Dynamic Programming

Q.4 Attempt any five. 15

a) Represent the following polynomials using linked list:

1)$A(X)=50X^5+8X^4+2X^2+4X+12$

2)$B(Z)= 70Z^4+50Z^3+4Z^2+5Z+10$

3)$C(Y)=25Y^3+32Y^2+4Y+98$

b) Six times of a number is equal to 48. Find the linear equation that corresponds to the situation and find the unknown number.

c) Explain properties of algorithm.
d) Write advantages and disadvantages of bubble sort technique.
e) Explain dynamic programming with an example.
f) Find factorial of number 6 using recursion.

B.C.S. College, Chinchwad
FYCS ATKT Sem-II Exam. Oct-24
Subject: Advanced Python
Date:- 04/10/2024

FYCS
ATKT 4/10/24

Time: $2^{1/2}$ Hours Total Marks: 75

Notes:

1. Figures to right indicate full marks.
2. All questions are compulsory. Use internal options to the questions.
3. Illustrations, in-depth answers and diagrams will be appreciated.
4. Mixing of sub-questions is not allowed.

Q. 1 Attempt any four of the following. (20M)

a) What is regular expression? Explain with example.
b) Explain the following term:
   i) Calendar Module
   ii) timedelta Module
c) Write a python program to read content of 'first.txt' file and write same content in 'second.txt' file.
d) With the help of example differentiate between match() and search() function.
e) Write a python program to read number from number.txt file and find out the number is Armstrong if the number is Armstrong then store it in Armstrong.txt file.
f) What is thread? Which methods are provided to the thread class? Explain.

Q. 2 Attempt any four of the following. (20M)

a) How to use fonts and colours in python? Explain with example.
b) Explain the following exception:
   i) TypeError ii) ValueError iii) ZerodivisionError
   iv) NameError v) IndexError
c) What is a GUI programming? Write advantages and disadvantages of GUI programming.
d) Write a python program to create server-client and exchange data.
e) When 'finally' and 'else' clause used in python exception handling? Explain.
f) Explain following database connectivity term with syntax and example:
   i) Update ii) Delete iii) Create table
   iv) Drop table v) Insert values into table

Q. 3 Attempt any four of the following. (20M)

a) Explain polymorphism in object oriented programming with example.
b) With the help of example explain method overriding.
c) Explain following terms with examples:
   i) How to create an object
   ii) Assign value to an object
   iii) Modify value to an object
   iv) How to pass value to class using an object
d) What is Abstract class? Explain with example how abstract base class work.
e) Differentiate between Single Level Inheritance and Multilevel Inheritance. Explain.

P.T.O.

f) Write a program in python to develop a payroll program for company using abstract class. The company has two groups of employees: full-time employees and hourly employees. The full-time employees get a fixed salary while the hourly employees get paid by hourly wages for their services. The payroll program needs to print out a payroll that includes employee names and their monthly salaries. To model the payroll program in an object-oriented way to create the following classes:
Employee, FulltimeEmployee, HourlyEmployee, and Payroll.

Q. 4 Attempt any five of the following. (15M)

a) Explain with example various types of file mode.
b) With the help of example explain date and time in python.
c) What is socket? Which functions is used to create socket? Explain.
d) Write a program in python to create login window.
e) What is operator overloading? Explain with an examples.
f) Explain following Object Oriented Programming terms :
i) __init__() function ii) class iii) self

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D.B.J. College, Chiplun
FYCS ATKT Sem-II Exam. Oct. 2024
Subject:- Introduction to OOPS using C++

Time: 2 Hr. 30 Minutes Date:- 05/10/2024 Max. Marks: 75

Notes:
1) All questions are compulsory.
2) Figures to right indicate full marks.
3) Assume necessary data as required.

Que 1 **Attempt any Four of the following.** 20
- A Write characteristics of OOP.
- B Explain data types of C++.
- C Describe the major parts of a C++ program.
- D Differentiate Class and Object.
- E Write a C++ program on Inline function.
- F Write a C++ program on "Default argument function".

Que 2 **Attempt any Four of the following.** 20
- A Write note on Operator overloading.
- B What are Static members in C++? Explain characteristics of static data member.
- C What is Constructor? Describes its types.
- D Explain rules of overloading operators.
- E Write a C++ program that implements (=) sign using operator overloading.
- F Write a C++ program on copy constructor.

Que 3 **Attempt any Four of the following.** 20
- A Explain with file operations with syntax.
- B State the rules for creating Virtual functions.
- C Elaborate concept Pointer to Objects.
- D Explain the role of "Virtual base class" in Inheritance with suitable example.
- E Write a C++ program on Single Inheritance.
- F Write a C++ program that copies contents of One file to another file.

Que 4 **Attempt any Five of the following.** 15
- A What is meant by Polymorphism? Give its types.
- B Enlist characteristics of constructor.
- C Write rules of Friend Function.
- D Describe file stream classes.
- E What is Inline function? Gives situations where inline does not work.
- F Describe Public, Protected and Private access specifiers.

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D.B.J. College, Chiplun
F.Y.C.S. ATKT Sem-II Exam. Oct-24
Subject:- Database system
Date:- 07/10/2024

AYCS
7/10/24

Time: 2½ hrs Marks: 75

N.B. 1) All questions shall be compulsory with internal choice within the questions.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q1 **Attempt any Four.** 20

A With the help of suitable diagram explain level of abstraction.
B Write a note on DBMS architecture.
C Explain client server architecture of database system.
D With the help of example explain entity Vs attribute.
E Explain insert and update table queries with suitable example
F State and explain the different data types in SQL.

Q2 **Attempt any Four.** 20

A State and explain operators of relational algebra.
B Illustrate different types of outer join in SQL.
C State and explain string functions in detail.
D Write a note on relational constraints.
E Where do we need nesting of queries? Give an example.
F With the help of suitable example explain IN and EXISTS query.

Q3 **Attempt any Four.** 20

A Write a note on transaction control commands (commit, rollback).
B Explain the concept of functional dependency with an example.
C With the help of suitable example explain Third normal form.
D Explain the role of views.
E Explain the role of database administrator.
F Briefly explain discretionary access control of DBMS.

Q4 **Attempt any Five.** 15

A Define domain, tuple and relation.
B How to relate two entities in ER-Diagrams? Explain with student and book entities.
C Consider the following schema:
Suppliers (sid, sname, address)
Parts (pid, pname, colour)
Write the sql queries for the following:
1)Find the pids of parts who part colour is red or green.
2)Find the sids of suppliers who address is chiplun.
3)Find the pids of parts who part colour is red and pname is Y1X5 .
D Explain any three math functions in brief.
E Write a note on primary index.
F Explain the following:
a) Ternary relationship b) Weak entity set c) Normalization.

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D.B.J. College, Chiplun
F.Y.C.S. MTH Sem-II Exam. Oct-24

FYBSc CS
8/10/24

Subject:- Calculus

Date:- 8/10/2024

Time: $2\frac{1}{2}$ hours | Marks: 75

Instruction: - 1. All questions are compulsory.
2. Use of calculator is not allowed
3. Figures to the right indicate full marks.

Q.1 **Attempt any FOUR.** (20)

i) Find the equation of the tangent plane and the normal to the surface $xyz = 4$ at the point (1,2,2).

ii) Find the linearization of the function $f(x, y) = x^3y^3 + y$ at point (1, 2).

iii) If $f(x, y, z) = xy + yz + xz$, find ∇f at (1,2,3).

iv) Apply chain rule to find $\frac{df}{dt}$ for $f(x, y) = 3x^2 - xy^2$, $x = -2t$, $y = 1 - t$.

v) Find the directional derivatives of $f(x, y, z) = 5x^2 - 4xyz$ at $u = (-1,1,2)$ along $\bar{v} = \bar{i} + \bar{j} + \bar{k}$.

vi) Find f_x, f_y, f_{xx}, f_{yy}, f_{xy} for the function $f(x, y) = x^3y^2 + x^2y^3$.

Q.2 **Attempt any FOUR.** (20)

i) Find the maximum and minimum value for the function $f(x) = 3x^3 - 9x^2 - 27x + 15$

ii) Find $\frac{dy}{dx}$, $y = 7^x(x^5 + 3x^4 + 2x^2 - x)$.

iii) Find the interval on which function f(x) is increasing or decreasing where $f(x) = 10 - 6x - 2x^2$

iv) Divide 100 into two parts such that their product is maximum.

v) Check whether the function $f(x)$ is increasing or decreasing $f(x) = 4 + \frac{1}{x}$

vi) Find Critical points (a) $f(x) = x^3 - 48x$ (b) $f(x) = 3x^4 - 4x^3$

Q.3 **Attempt any FOUR.** (20)

i) Find an integrating factor for the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2 \log x$.

ii) If $\int_1^4 (3x^2 + bx + 5)dx = 93$, then find the value '$b$'.

iii) Solve the differential equation : $x\frac{dy}{dx} = \sqrt{y}$.

iv) Evaluate $\int (x - 1)^2 \, dx$.

v) Find the Value of $\int_0^1 \frac{1}{x+2} \, dx$.

vi) Find area of the region bounded by the parabola $y^2 = 4x$ and the line $x = 1$ and $x = 4$.

Q.4 **Attempt any FIVE.**

i) If $\int_0^a (2x+1)dx = 2$, then find the value 'a'.

ii) What is the standard form of linear differential equation? What is the standard form of its solution?

iii) Divide 60 in two parts such that the sum of their squares is a minimum

iv) Find f_x, f_y, f_{yy} for the function $f(x, y) = x^4y^3$ at point (1, 2).

v) Evaluate $\int xe^x\, dx$.

vi) Find $\frac{dy}{dx}$, If $y = \frac{x+1}{2x+2}$.

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