WEST BENGAL STATE UNIVERSITY

B.Sc. Honours Part-III Examination, 2020

COMPUTER SCIENCE

PAPER-CMSA-VI

Time Allotted: 2 Hours   Full Marks: 50

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

Answer Question. No. 1 and any *two* from the rest of the groups

1.   Answer any ***nine*** questions from the following: 2×9 = 18

   (a) What do you understand by Virtual function?

   (b) State the significance of Software Reverse Engineering.

   (c) What are aspect ratio and bitmap in video display devices?

   (d) What is the function of frame buffer?

   (e) What do you mean by morphying?

   (f) What do you mean by instances and schema?

   (g) What is cyclomatic complexity?

   (h) Explain in brief about the term cohesion.

   (i) Differentiate parallel and perspective projection.

   (j) Differentiate between primary key and candidate key.

   (k) Differentiate between validation and verification.

   (l) What is software quality?

   (m) When is a relation said to be in 2NF?

   (n) What is a friend function?

   (o) State any two applications of Computer Graphics.

GROUP-A

(Object Oriented Programming)

2. (a) Write a program for addition of two complex numbers overload '+' binary operator using friend function.   8

   (b) Write a program to demonstrate use of static data members and static member function.   8

3. (a) How does data hiding accomplish in a class? Why is it required? 2+2

   (b) What is dynamic initialisation of objects? Why is it required? How is it achieved? 1+2+3

   (c) What are the precautions required if classes use the "new" operator to allocate memory? 2

   (d) How is polymorphism achieved at (i) compile time and (ii) runtime? 2+2

GROUP-B

(Software Engineering)

4. (a) What is software life cycle? What are SDP and SDLC? (3+3)+6+4

   (b) Discuss various stages of classical waterfall model.

   (c) Differentiate between black-box testing and white-box testing with suitable examples.

5. (a) What are the characteristics of a good test case? Discuss static and dynamic analysis in testing. 6

   (b) Discuss basic design steps for producing high quality software. What is balancing DFD? State significance of control flow graph. 4+(2+2)

   (c) Write at least two disadvantages of classical waterfall model. 2

GROUP-C

6. (a) Explain Bresenham Line Algorithm and show how Bresenham's line algorithm draws a line that starts with (4,4) and end with (-3,0). 10

   (b) What are the conditions under which scaling and rotation forms a commutative pair of operations? 6

7. (a) Perform a 45° rotation of triangle A(0, 0), B(1, 1), C(5, 2) 5+4+3+2+2

   (i) about the origin

   (ii) about a point P(-1, -1)

   Find the final coordinates.

   (b) What is the blackening effect of CRT? How it is resolved?

   (c) What is pixel? What is Raster Scan display?

GROUP-D

8. (a) What is data independence? What is referential integrity? 2+1

   (b) Define the functional dependencies with an example. What is meant by lossless-join decomposition? Illustrate the transitive dependencies. 2+2+1

(c) What are the drawbacks due to data redundancy? How can these drawbacks be minimised? — 2+3

(d) Write short note on the concept of security of a database. — 3

9. (a) Consider the following relational database: — (2×3)+5+(3+2)

> Flights (<u>flno</u>, from, to, distance, departs)
>
> Aircraft (<u>aid</u>, <u>aname, range</u>)
>
> Certified (<u>eid, aid</u>)
>
> Employee (<u>eid</u>, ename, salary)

Specify the following queries in relational algebra

(i) Find name of pilots who are certified on some Boeing.

(ii) Find flno of flights that can be piloted by every pilot whose salary is over Rs. 1,00,000.

(iii) Find eid of employee(s) with the highest salary.

(b) Write a short note on B+ tree.

(c) Differentiate between dense and sparse indexing.

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