Sindh Madressatul Islam University, Karachi

Department of Computer Science

Spring 2020

CSC 104 – OBJECT-ORIENTED PROGRAMMING

FINAL EXAM (TAKE HOME) Total Points: 40

Due Date/Time: Monday, September 07th, 2020, 04:30 PM

PROBLEM SET:

Select two of the following management systems of your choice and code a C++ project. The options under every management system depict the must-have classes in that system. Insert meaningful data members and member functions in every class to make sense of your management system.

A. Hospital Management System
- a. Doctor (has patients)
- b. Patient (has disease)
- c. Hospital (has doctors)
- d. Disease

B. Hotel Management System
- a. Room (has customer)
- b. Customer (occupies rooms)
- c. Manager

C. Supermarket Management System
- a. Product
- b. Manufacturer (has products)
- c. Buyer (has products)
- d. Market Branch (has products)

D. Travel Management System
- a. Customer (associates - Agent)
- b. Place
- c. Travel Agent (has customers)

E. Movies Data Management System
- a. Movie (has actors)
- b. Director (has movies)
- c. Cinema (has movies)
- d. Actor

F. Cricket Management System
- a. Team (has matches)
- b. Match (has a venue)
- c. Venue
- d. Player (has a team)

G. Taxi Cab Management System
- a. Car (has driver)
- b. Driver (has car)
- c. Rider (has a ride)
- d. Ride

H. Music Library Management System
- a. Singer (has song)
- b. Song (has Record Label)
- c. Record Label (Music Company)

I. Bank Management System
- a. Account Holder (has account)
- b. Account
- c. Bank (has accounts & manager)
- d. Manager

J. Game Management System
- a. Game Company (has game)
- b. Game (has platform)
- c. Platform
- d. Gamer (has game)

Question 01: You must make at least two meaningful new classes that will be child classes of any one of the given classes. **[10 points]**

Question 02: All the classes should contain the following: **[10 points (2 points each)]**

a. A parameterized constructor
b. At least one data member
c. Counter for number of objects
d. A Display Data Member Function
e. A Copy Constructor

Question 03: Inside main(), make a ***vector*** of each class and use every vector member (at least two) to invoke member function(s). **[10 points]**

Question 04: Describe the following topics in your own words: **[10 points (2 points each)]**

a. Polymorphism
b. The Diamond Problem
c. Template Functions
d. Friend Classes
e. Composition

Bonus Points Question: **[10 points (2 points each)]**

Make a map in main() having the following characteristics:

a. Set one of your classes as the key and other class as the value
b. Insert at least three key-value pairs in the map
c. Overload < operator in your Key class.
d. Swap first and last values of the map (after default sorting; keys will remain intact)
e. Print the key value pairs

Some hints that might help you in solving this question:

- Usage of the keyword ***const*** might help
- You won't be able to use Key class in map properly until the overloading function is working properly.

*************END OF PROBLEM SET*************

SUBMISSION INSTRUCTIONS:

For LMS

1. Write Question No.4 in a word document and save it as csc19f123_AB_Q4.docx.
2. Code all files in a single project (Name you project as your roll number without dashes and your section after underscore e.g. ***csc19f123_AB_FinalExam***)
3. Make headers and implementations for all classes separate e.g. Singer.h for class structure and Singer.cpp for implementations, etc.
4. Compress your project folder containing all the files and your word file as a single ".zip" file having the same name as your project e.g. "**csc19f123_AB_FinalExam.zip**". (Video Link)
5. Upload the file on your LMS Assignment titled as "Final Exam Submissions – OOP".
6. No Update Submissions will be allowed. You can only submit your solution only once.
7. No late submissions are allowed on LMS.

For Email

8. In addition to submitting on LMS, you are also required to submit your solution on email as well.
9. Attach the file (as mentioned in point 3) in email.
10. Write subject as "***Final Exam – OOP – AB – csc19f123***" (or CDE instead of AB if your section in CD).
11. Write your full name and roll number in email body.
12. Send the email to ***oopspring2020smiu@gmail.com***.
13. Email Submission's due date is the same as the due date mentioned in your assignment as well as on LMS.
14. Late submissions will be allowed on Email. However, late submission's acceptance is subject to instructor's approval and it will only be accepted with 40% marks deduction from your obtained marks.

*********THE END*********