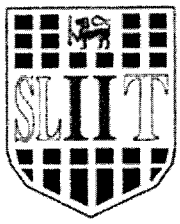


Sri Lanka Institute of Information Technology

B.Sc. Honours Degree in Information Technology

Final Examination
Year 1, Semester 2 (2022)

CSIT1050–Object Oriented Concepts

Duration: 2 Hours

June 2022

Instructions to Candidates:

- This paper has 4 questions.
- Answer all other questions in the booklet given.
- The total marks for the paper is 100.
- This paper contains 5 pages, including the cover page.
- Electronic devices capable of storing and retrieving text, including calculators and mobile phones are not allowed.
- This paper is preceded by 10 minutes reading period. The supervisor will indicate when answering may commence.

Question 01 (40 Marks)

Write the answers to the following questions

a). Write the steps in developing an Object-Oriented Programming? (5 marks)

b). A system has three classes, *Student*, *WeekendStudent* and *WeekdayStudent*. *WeekendStudent* class and *WeekdayStudent* are child classes of the *Student* class. Draw **all three** classes using correct UML notations. (Show the possible attributes that can be inside the classes with correct access specifies. No need to add methods) (6 marks)

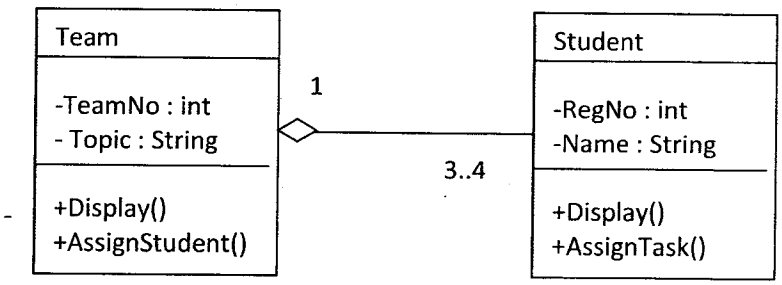
c). Write the classes that can be identified in the scenario given below?

A university conducts many seminars. Students can register for a seminar by providing his/her details. Once a student registers, they can search and enrol for seminars. Professor is assigned to a seminar depending on his/her specialization. Venue for the seminar would be chosen depending on the availability of the building. (4 marks)

d). Consider the classes below and write the relationship that can exist between the given classes. Draw the correct UML notation to represent the relationship. Mention the multiplicity where necessary. (10 marks)

i. Pet, Dog
ii. School, Classroom
iii. Cinema, Seat
iv. Customer, Loan
v. Bank, Branch

e). Consider the diagram below and answer the questions.



i) What is the relationship shown in the diagram? (2 marks)

ii) Explain the reason to select the relationship mentioned in Part (i) for the given two classes. (3 marks)

iii) Describe the relationship on your own words considering multiplicity. (2 marks)

iv) If the student can be a Software Engineering (SE) Student or Information Technology (IT) student then how would you add two more classes (SEStudent and ITStudent) to the above diagram. Draw the modified diagram with correct UML Notations. (4 marks)

v) Write the C++ code of the SEStudent class assuming that the Student class already exists. Add *GPA, Certification* as properties for SEStudent and *Display()* and *AssignProject()* as methods. (You don't need to implement the methods) (4 marks)

Question 02 (25 marks)

Read the following description about the Share Market Portfolio Management System and answer the questions.

The Portfolio manager shall be able to roll up Portfolios on several levels. A trader shall be able to place orders, on behalf of a portfolio, that generate one or more trades. A portfolio manager shall be able to select a payoff method in conjunction with placing sell order. The entry of a trade shall generate forecasted cash-flows associated with the given trade lot. The system shall match up actual cash-flows with forecasted cash-flows. The system shall automatically generate appropriate posting to the General Ledger. The system shall allow an assistant trader to modify trade data and propagate the results accordingly.

a) List the nouns in the above description. (5 marks)

b) Apply the rejecting rules for each noun you have identified above. (5 marks)

c) List the final list of classes for the above scenario. (5 marks)

d) Draw the CRC cards for any 5 classes you have identified in part c. (10 marks)

Question 03 (15 marks)

Consider the following description and draw the class diagram. Clearly show the classes, relationships and multiplicity using UML notations.

A company Consists of many Departments. Departments are located in one or more offices. Headquarter is also an Office.

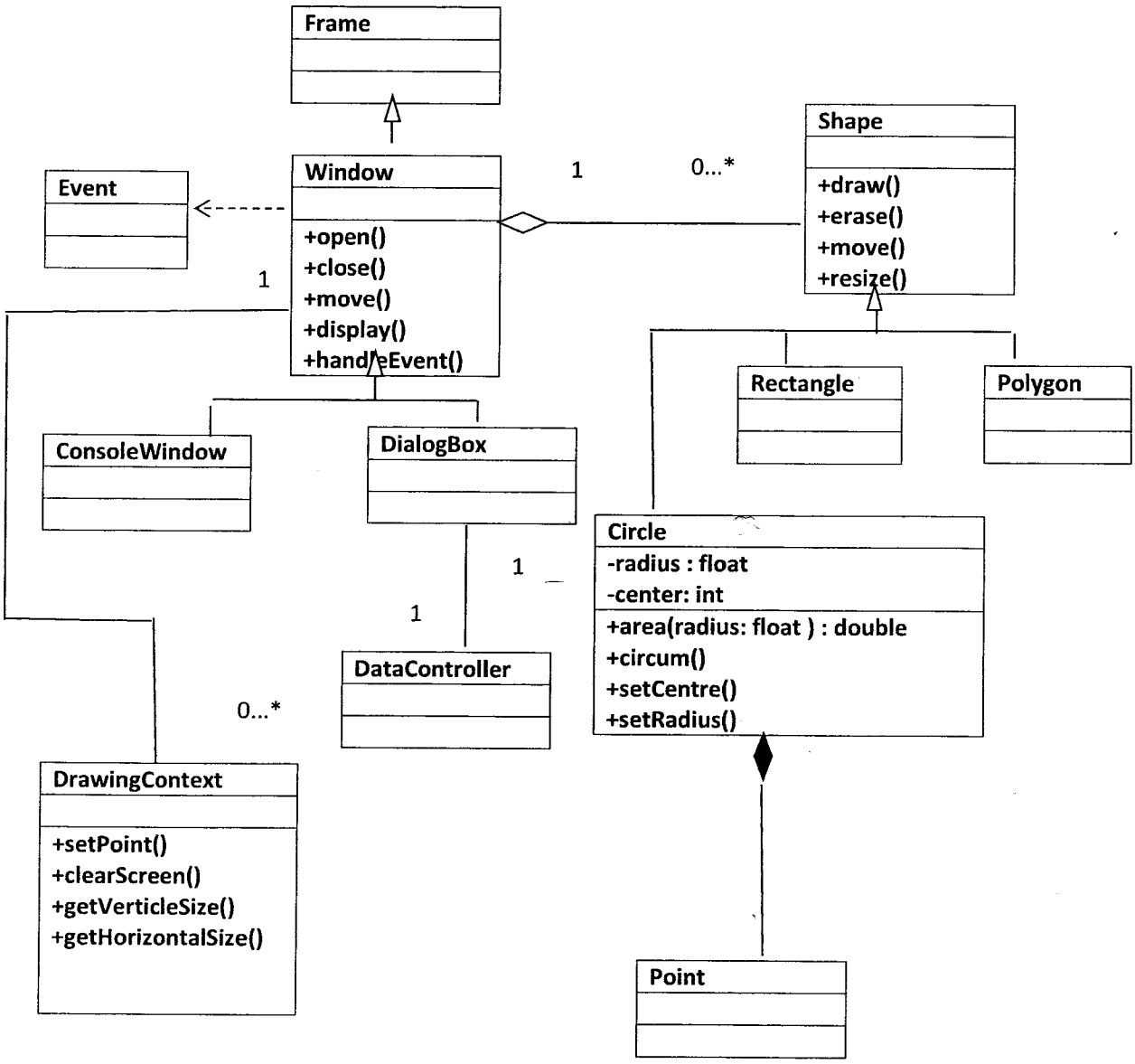
The company employs employees (who can only work for one Office). An employee can be an Executive officer or a Worker.

Departments have one Head who is also an executive Officer and have many Workers who are assigned for Projects run by each Department. Employees can work in 1 to 3 projects, while a project can have 2 to 50 assigned workers. Each project is managed by an employee who is also an executive officer of the company.

Question 04 (20 marks)

Consider the following class diagram and write the C++ code for the classes shown in the diagram.

(Add methods with implementations ONLY when you need to show the relationships)



End of Paper