UNIVERSITY OF MAURITIUS
FACULTY OF INFORMATION, COMMUNICATION AND DIGITAL TECHNOLOGIES

SPECIAL RETAKE EXAMINATIONS

AUGUST 2017

PROGRAMME	**BSc (Hons) Electronics with Computer Science** **BSc (Hons) Information and Communication Technologies**		
MODULE NAME	**Software Engineering**		
DATE	**Friday** **18 August 2017**	**MODULE CODE**	**CSE 2001Y(5)**
TIME	**09:30 – 12:30 Hrs**	**DURATION**	**3 Hours**
NO. OF QUESTIONS SET	**4**	**NO. OF QUESTIONS TO BE ATTEMPTED**	**4**

INSTRUCTIONS TO CANDIDATES

Answer ALL questions.

All questions carry equal marks.

Information sheet are attached.

Answer ALL questions.

Question 1

The SunShade hotel is planning to implement a hotel room reservation system in order to manage room bookings. You have been requested to perform the following tasks.

(a) Implement a class named RoomBooking with the following **private** fields:

room_type	<*String*>	Room type (Standard, Deluxe, Family)
num_days	<int>	Number of days room is booked
num_room	<int>	Number of rooms

The class contains

- a constructor that requires arguments for *room_type, num_days* and *num_room*.
- a method that displays the details of the room booking
- a method that calculates and returns the booking charges, based on the following daily room charges

	Standard	Deluxe	Family
US $ (per day)	100	200	400

[6 MARKS]

(b) Implement another class named PanoramicRoomBooking, which inherits from the RoomBooking class. A Panoramic room carries an additional charge on top of the room charges and the additional charge is based on the type of view from the room as given below:

	Garden View	Pool View	Sea View
US $ (per day)	20	30	50

The class contains one **private** field

view_type	<*String*>	Type of view from room (Garden, Pool, Sea)

The class contains the following methods:

- a constructor that requires arguments for *room_type, num_days*, *num_room*, and *view_type*
- a method that displays the details of the room booking
- a method that determines the total room charges

[6 MARKS]

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(Question 1 continued)

(c) Implement a class CreateBookings that will create an array of 5 room bookings as follows:

Bookings Number	Room Type	No of days	Number of rooms	
1	Standard	2	2	
2	Family	3	1	Garden view
3	Deluxe	1	3	
4	Standard	2	2	Pool view
5	Deluxe	5	1	Sea view

Your program should then display

- The bungalow details of each booking
- The total charges of all the bookings

[8 MARKS]

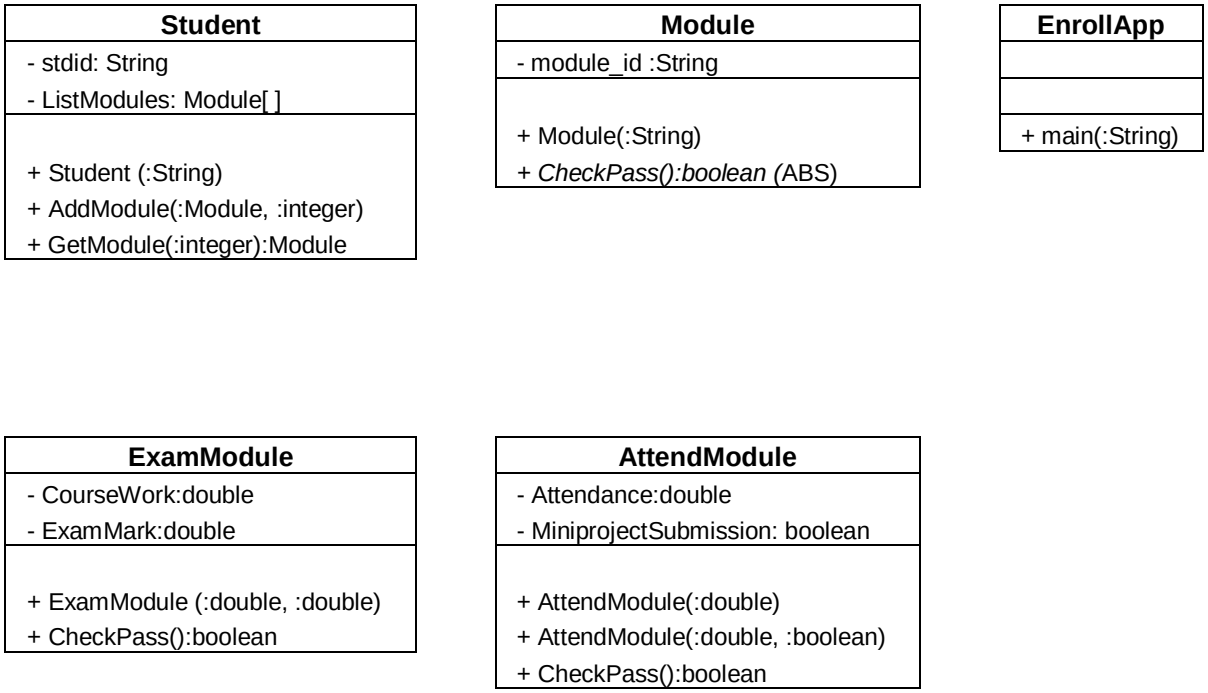
(d) Considering the above implementations, pinpoint sections of code (if any) that exhibit overloading, overriding and polymorphism.

[5 MARKS]

Question 2

At the university, students registering for year I of the Computer Science programme have to enroll in 5 compulsory modules. Three of them are assessed based on an end-of-year examination (70 marks) and a coursework (30 marks) consisting of tests and assignments. A student is said to pass such a module if he has above 30% in both course-work and exams and if the overall mark (coursework plus exams) is above 40 %. For the remaining two modules, as long as a student shows 80% class attendance and submits a mini-project, he is deemed to pass. A student earns 6 credits for every module he has passed.

The following UML diagram below models the enrollment of the batch of students.



(a) From the UML diagram, identify, if any, an abstract class and a concrete class.
[2 MARKS]

(continued next page)

(Question 2 continued)

(b) You are to implement **ALL** the five classes. Some method descriptions are given below:

Class	Method	Method Description
EnrollApp	main	Should prompt for and read the batch size, then create an array of Student to store all the enrollment details which are to be entered at the keyboard. Should finally display the total credits earned by each student.
Student	AddModule	Should store the module details at a particular location in the array ListModules
	GetModule	Return a reference to a module stored at some location in array ListModules
AttendModule	CheckPass	Should return whether student has passed the module
ExamModule	CheckPass	Should return whether student has passed the module

[16 MARKS]

(c) Rewrite modified sections of code so that the above application makes use of an interface instead of an abstract class.

[7 MARKS]

Question 3

Case Study

With the opening of the new airport, more tourists will be coming and leaving the island on a regular basis. The airline manager is thus foreseeing problems of long queue delays when passengers will check-in and check-out at the counters.

As a result, the airport manager wants to install at the airport a self-check-in kiosk system that will provide a host of services. For instance, the system will allow the passengers to print their boarding pass and their bagtags both using the same print layout. Moreover, passengers will be able to initiate their check-in procedures at the kiosk by entering their passport number. They will be able to review their flight details. All passengers can review and change their seats using an interactive seat map which is provided by the airline company. Based on the final destination, the system will quickly load the APIF (Advanced Passenger Information Form) which the passenger will have to complete. Besides, the system will allow passengers to indicate the number of bags they are carrying as luggage. Passengers will also be allowed to add or change their Frequent Flyer Information. Finally, the kiosk application will print the boarding passes and the passenger bagtags. The airport manager will like that the boarding pass be printed using the *IATA M Resolution 792* layout and the bagtags, using the *IATA CUSS 21* layout. The kiosk system will be touch screen and be able to process a large number of check-in's.

The kiosk system will also serve as an information kiosk which will provide the passengers with information on airport facilities such as restaurants, shops and lounges. Moreover, the kiosks can be used by airport operators to provide (sponsored) information on hotels, car rentals, tours and other services that might be of interest to the tourists. Besides, the airport manager is uncertain whether or not the kiosk system should, in addition, act as a retail kiosk allowing purchase of duty free merchandise.

The airport manager has a number of IT staffs who are trained in Java and Oracle databases. Since the airport works on a 24/7 hour, the system will need to be available at all times and should run on any operation systems.

(a) Explain the term "stakeholder". List 4 stakeholders for the above system.

[3 MARKS]

(b) Suggest 4 reasons why the waterfall model will not be suitable to implement the kiosk system?

[4 MARKS]

(c) Write down three functional requirements for the kiosk system.

[3 MARKS]

(continued next page)

(Question 3 continued)

(d) Identify two *testable* non-functional requirements and two *non-testable* non-functional requirements. Rephrase the non-testable requirements such that they are testable.

[6 MARKS]

(e) The System Requirement Document for the above case study is useful in various ways. State any three ways.

[3 MARKS]

(f) State three classes of audience for the System Requirement Document.

[3 MARKS]

(g) State the difference between bespoke and generic software. With justifications, state whether the software for the above case study is bespoke or generic.

[3 MARKS]

Question 4

(a) Consider the follow methods:

```
Module A        Process_Transaction_Record
                        ...
                        If transaction record is for a Male THEN
                            Process_Male_Student(Current_Record)
                        Else
                            Process_Female_Student(Current_Record)
                        ...
                End

Module B        Process_Male_Student(Current_Record)
                        Increment Male_Student_Count
                        If Student_Age > 21 THEN
                                Increment Mature_Male_Count
                        ...
                End
```

State the type of coupling used in Module A. Support your answer with appropriate justifications.

[5 Marks]

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(Question 4 continued)

(b) Consider the pseudocode below:

```
input (a)
input (b)
input (c)
if (a<b+c) AND (b<a+c) AND (c<a+b)
      IsATriangle = T
else
      IsATriangle = F

if (IsATriangle = T)
         if (a=b) AND (b=c)
              Output = "Equilateral"
         else if (a != b) AND (b != c) AND (a != c)
              Output = "Scalene"
         else
              Output = "Isosceles"
 else
       Output = "Not a triangle"
 Print Output
```

(i) Draw the flow graph for the above code.

(ii) Calculate the cyclomatic complexity of the flow graph.

(iii) List all the different paths that have to be tested for your flow graph.

[7 + 1+ 4 marks]

(c) (i) Define what is quality assurance.

(ii) Describe any three activities that take place in quality assurance.

[2 + 6 Marks]

END OF QUESTION PAPER

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