ANKARA UNIVERSITY

Department of Computer Engineering – COM244 - Object Oriented Programming

Mid-Term Examination I

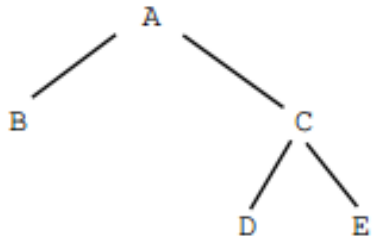
Duration: 90 Minutes

Date: 19/04/2019

Name and ID:

1.) [20 points]
a.) [8 points] What is polymorphism? Give a simple example code implemented in Java to demonstrate how polymorphism works.
b.) [6 points] What are the conceptual differences between Aggregation and Composition? Give an example code using Java to highlight those differences.
c.) [6 points] What does it mean for a member of a class to be static? Compare how static and non-static methods are called outside of a class

2.) [10 points] Consider the inheritance hierarchy shown at left. Each part of this question is independent



a.) [6] In which class(es) would it make most sense to have protected members? Which class(es) would be able to access those protected members directly?
b.) [4] Which class(es) can access private members of class C directly ?

3.) Draw a use case diagram for the following scenarios [20p]: A customer has a mobile phone that the phone handles messages and calls by a service provided by the external phone company. The customer on the other hand can pay the phone bill. However the bill is only paid online via the website of the external bill company. To pay the bill, the customer must login to the website.

Read to the description of a system below and answer the questions following it.

A product is to be installed to control elevators in a building with m floors. The problem concerns the logic required to move elevators between floors according to the following constraints:

- Each elevator has a set of m buttons, one for each floor. These illuminate when pressed and cause the elevator to visit the corresponding floor. The illumination is canceled when the elevator visits the corresponding floor.
- Each floor, except the first floor and top floor has two buttons, one to request and up-elevator and one to request a down-elevator. These buttons illuminate when pressed. The illumination is canceled when an elevator visits the floor and then moves in the desired direction.
- When an elevator has no requests, it remains at its current floor with its doors closed.

The basic course of Action for elevator scenario:

- Passenger presses floor button (that is the button on the wall).
- Elevator system detects floor button pressed.
- Elevator moves to the floor.
- Elevator doors open.
- Passenger gets in and presses elevator button (that is the button in the cabin panel).
- Elevator doors close.
- Elevator moves to required floor.
- Elevator doors open.
- Passenger gets out.
- Elevator doors close

4.) [25] Draw the Sequence diagram about to the floor button .

5.) [25] Draw the detailed class diagram for the elevator system.