

Name: \_\_\_\_\_

Student#: \_\_\_\_\_

CSE Account: \_\_\_\_\_

Points: \_\_\_\_\_ /9

Show all work clearly and in order, and underline your final answers. Use Eiffel notation when necessary, sketch all relevant graphs and write down all relevant mathematics. You have 30 minutes to take this 9 points (3%) quiz.

1. (\_\_\_\_\_/5 points) Multiple choice questions

1. From the **module** viewpoint: if B inherits from A ...
  - A. all the services of B are potentially available in A
  - B. all the services of A are potentially available in B
  - C. whenever an instance of B is required, an instance of A will be acceptable
  - D. whenever an instance of A is required, an instance of B will be acceptable
2. Ancestors of class B are ...
  - A. class B and all classes that inherit from B
  - B. the parents of B and their ancestors
  - C. only the parents of B
  - D. B itself and the ancestors of its parents
3. *Whenever a software system must support a set of alternatives (e.g. variants of a figure in graphic systems), one and only one module in the system should know their exhaustive list*  
The statement above is a part of which OO principle?
  - A. Single Choice Principle
  - B. Open-Closed Principle
  - C. Liskov Substitution Principle
  - D. Single Responsibility Principle
4. What does the Polymorphism mean in the context of OO design?
  - A. the ability of the class to inherit from the arbitrary class
  - B. the ability of the class to call features from other classes and objects
  - C. the ability of the class to be renamed and casted to some other class
  - D. the ability of its entities (attributes, arguments, local variables) to become attached to objects of different types
5. What happens with pre- and post-conditions of the feature when the feature is inherited and redefined?
  - A. only new pre- and post-conditions are used (old are ignored)
  - B. precondition and postconditions are connected by OR
  - C. precondition is connected by OR and postconditions by AND
  - D. precondition is connected by AND and postconditions by OR

2. (\_\_\_\_\_/4 points) For the following requirements identify candidate classes (with appropriate names) and define their relationships using BON. Use compressed notation to represent classes. Make sure to show all association and aggregation labels. Explain why you chose the relationships (*is\_a* and *has\_a*) in your diagram. If any of the requirements should be implemented as class invariants, indicate the class that must contain the invariant, explain why, and write the invariant as a mathematical expression.

**Requirements:** A coffee shop offers several types of hot drinks including coffee, hot chocolate, and tea. The price of tea is less than the price of coffee and coffee is cheaper than hot chocolate. Price of the drink can be modified on run-time. Each drink can have additions such as extra white or brown sugar, honey, regular, skim or 0% milk, half-and-half, soy milk, and variety of flavour shots. Some extras can increase the price while others may be free (e.g., favour shots are \$0.5 while sugar is free).

#### Answers

1. B 2. D 3. A 4. D 5. C