

CSE 112 3. Midterm

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I. QUESTION (20 POINTS)

Draw the UML diagram of questions asked in an **Exam**. An **Exam** consists of a name and a set of questions.

Each **Question** has a question string, number of points, question no and a level which can be EASY, NORMAL or HARD defined in the class **QuestionLevel** and two abstract methods **void displayQuestion()** and **void displayAnswer()**.

Two questions will be compared according to their question numbers. But we also need to compare two questions based on their level of difficulty so we have a class **QuestionDifficultyComparator**.

Each **MultipleChoiceQuestion** is a type of **Question** which has a set of choices represented by an ArrayList of string and a correct answer represented by a number.

Each **TrueFalseQuestion** is a type of **Question** having correct answer as true or false.

Each **EssayQuestion** is a type of **Question** having a string as correct answer.

Both the exam and its answers will be displayed with functions **void displayExam()** and **void displayAnswers()**. The total points of the exam will be calculated by the function **int totalPoints()**. We also have two functions to sort questions with respect to their question numbers **void sortQuestions()** or difficulty **void sortQuestionsDifficulty()**.

Define attributes and constructors for these classes. Do not define any setter or getter methods except for getter methods for number of points and level in **Question**.

II. QUESTION (65 POINTS)

Implement the classes **Exam**, **Question**, **QuestionLevel**, **MultipleChoiceQuestion**, **TrueFalseQuestion**, **EssayQuestion**, **QuestionDifficultyComparator** according to your UML diagram.

III. QUESTION (15 POINTS)

Declare a test class **TestExam** to do the following. CSE340 exam has the following questions:

- (Hard, 15 points) What is the name of the exam? Choices: CSE340, CSE112, Both, None. Answer: CSE340.
- (Easy, 5 points) The exam is easy, isn't it? Answer: True.
- (Normal, 10 points) What grade do you expect from this course? Answer: AA

First sort the exam according to difficulty, then display the exam, then print the total points of the exam, at the end display the answers to the exam.