

## CSCE 240 – Programming Assignment Six

**Due:** 11:59pm on Monday, April 24

### Purpose

Add virtual functions to the *Question*, *TrueFalseQuestion*, *ShortAnswerQuestion*, and *MultipleChoiceQuestion* classes from Programming Assignment 5. For this assignment you will begin with the *TrueFalseQuestion*, *ShortAnswerQuestion*, and *MultipleChoiceQuestion* class header and source files that you submitted for assignment 5, and *question.h* file that was provided for assignment 5 (you will make minor edits to the contents of *question.h* for this assignment).

### Specifications

- Add a bool parameter to the *Print* function prototype in *question.h*. This parameter will not be used by the function, but simply makes the function prototype match the prototypes of the *Print* functions in the derived classes.
- Make the *Print* function virtual in the *Question*, *TrueFalseQuestion*, *ShortAnswerQuestion*, and *MultipleChoiceQuestion* classes.
- Make the destructor for each of the *Question*, *TrueFalseQuestion*, *ShortAnswerQuestion*, and *MultipleChoiceQuestion* classes virtual.
- Add a pure virtual *CheckAnswer* function to the *Question* class. The function should take a string argument and return true if the answer is correct and false if the answer is incorrect.
- Implement the virtual *CheckAnswer* function in the *TrueFalseQuestion*, *ShortAnswerQuestion*, and *MultipleChoiceQuestion* classes.
- Add code to the end of the main function in *checkstudentanswers.cc* (after line 111) to read a text file with student answers and determine how many questions the student answered correctly. Read the comments beginning on line 111 for more details.
- You will submit *question.h*, *truefalsequestion.h*, *truefalsequestion.cc*, *shortanswerquestion.h*, *shortanswerquestion.cc*, *multiplechoicequestion.h*, *multiplechoicequestion.cc*, and *checkstudentanswers.cc* to the assignment in Blackboard.
- Source files must compile and run on a computer of the instructor's choosing in the Linux lab (see your course syllabus for additional details).

### Testing

- A makefile has been included to aid in using the class header and source files, *checkstudentanswers.cc*, and *checkp6.cc* to compare your programs output to the expected output for the provided *samplekey.txt* and *samplestudent.txt* input files. To use the makefile, your program 6 directory should include:  
your files: *question.h*, *truefalsequestion.h*, *truefalsequestion.cc*,  
*shortanswerquestion.h*, *shortanswerquestion.cc*,  
*multiplechoicequestion.h*, *multiplechoicequestion.cc*,  
*checkstudentanswers.cc*  
the *makefile*  
the test files: *checkp6.cc*, *samplekey.txt*, and *samplestudent.txt*

- To run the provided tests type: *make checkstudentanswers*

### **Grade Breakdown**

Style *truefalsequestion.h*: 0.1 point

Style *truefalsequestion.cc*: 0.1 point

Style *shortanswerquestion.h*: 0.1 point

Style *shortanswerquestion.cc*: 0.1 point

Style *multiplechoicequestion.h*: 0.2 point

Style *multiplechoicequestion.cc*: 0.2 point

Style *checkstudentanswers.cc*: 0.2 point

Documentation: 1 point

Clean compilation of *truefalsequestion.cc*: 0.3 point

Clean compilation of *shortanswerquestion.cc*: 0.3 point

Clean compilation of *multiplechoicequestion.cc*: 0.4 point

Clean compile/link of *checkstudentanswers.cc*: 1 point

Correctness of the virtual destructors: 2 points

Produces correct output with modified key and student text files: 4 points

The penalty for late program submissions is 10% per day, with no submission accepted after 3 days.