**Lambda Expressions**   
  
Workshop 5

In this workshop, you convert the grades earned by students in a course to letter values using Seneca's grading scale.

**LEARNING OUTCOMES**

Upon successful completion of this workshop, you will have demonstrated the abilities to

* use a lambda expression to define an operation on a set of data values
* prevent the copying, moving and assigning of an object
* throw and report an exception
* reflect on what you have learned in this workshop

**SPECIFICATIONS**

This workshop reads a file containing student numbers and grades and converts the grades to letter values using the following scale:

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| Grade Range | Letter Grade |
| 90-100 | A+ |
| 80-89 | A |
| 75-79 | B+ |
| 70-74 | B |
| 65-69 | C+ |
| 60-64 | C |
| 55-59 | D+ |
| 50-54 | D |
| 0-49 | F |

Decimal values round to nearest integer.

**Grades Class**

Design and code a class named **Grades** that holds the grades for all students in a course.  Upon instantiation, a **Grades** object receives the address of a C-style null-terminated string that contains the name of the file holding the grade information for all students in a course.  The object allocates memory dynamically and stores this information.  Each file record contains one student number and a grade, which may include a decimal value.  If the object cannot open the file, the constructor throws an exception with a suitable message.

Your design includes the following member function:

* **void displayGrades() const** - receives a reference to the output stream object and the expression to be used in determining the letter grade.  Your function displays the student number, the student grade, and the letter equivalent as shown below on the right.

Your design prohibits copying, moving or assigning of a **Grades** object.

Store your design in a header file named **Grades.h**.

**Main Function**

The shell of the main function that uses your **Grades** class is listed below on the left.  A file containing student information, which you may use to test your code, is available [here](https://scs.senecac.on.ca/~oop345/pages/workshops/w6.dat).

Complete the coding of this main function by

* defining the lambda expression (**letter**) that converts a numeric grade to its letter equivalent
* adding the code to report an exception if any has been thrown

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| **// Workshop 6 - Lambda Expression**  **// w6.cpp**  **#include <iostream>**  **#include "Grades.h"**  **int main(int argc, char\* argv[]) {**  **if (argc != 2) {**  **std::cerr << argv[0] <<**  **": incorrect number of arguments\n";**  **std::cerr << "Usage: " << argv[0] << " file\_name\n";**  **return 1;**  **}**  **Grades grades(argv[1]);**  **// define the lambda expression for letter**  **grades.displayGrades(std::cout, letter);**  **std::cout << "Press any key to continue ... ";**  **std::cin.get();**  **}** | **1022342 67.40 C+**  **1024567 73.50 B**  **2031456 79.30 B+**  **6032144 53.50 D**  **1053250 92.10 A+**  **3026721 86.50 A**  **7420134 62.30 C**  **9762314 58.70 D+**  **6521045 34.60 F** |

**SUBMISSION**

Follow your professor's submission instructions