Lab 5

Lambda Expressions

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

**SPECIFICATIONS**

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

|  |  |
| --- | --- |
| 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.

Letter Enumeration

Design and code a scoped set of enumeration constants named **Letter** that identify the letter values for the grades in a course.  Include in your design, a function that converts each enumeration constant into a C-style null-terminated string.  The function receives an unmodifiable reference to one of the enumeration constants and returns the address of string that represents that constant.

Enclose your design in the **sict**.  Save your design in a file named **Letter.h**.

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 (row) 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 template member function:

* **void displayGrades(std::ostream&, <function Pointer>) const** - receives a reference to the output stream object and the address of the lambda function to be used in determining the letter grade.

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

Store your class definition in a header file named **Grades.h**.  Store your special function definitions in an implementation file named **Grades.cpp**.

Main Function

Complete coding the main function by

* defining the lambda expression (**letter**) that converts a numeric grade to its letter equivalent
  + HINT: You should be using the letter enumeration and function created in *Letter.h*
* add the code to report an exception if any has been thrown

Output

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+