**ECE 15200: Programming for Engineers**

**Purdue University Northwest, ECE Department**

Laboratory 3: Selection

**Instructions**:

* Submit only C++ source files (\*.cpp) for all the problems through Brightspace.
* Name each file following the format ***Lastname\_*Lab*X*\_p*Y*.cpp**, replace *Lastname, X,* and *Y* with your last name, lab #, and problem #, respectively.
* Put your name, assignment number, and date on the top of each source file (\*.cpp) as multi-line comment given below:

/\*

Class: ECE15200

Author: [Your Name]

Assignment: Lab [No.]

Date: [MM]/[DD]/[YY]

\*/

Remove the brackets after updating the information in them.

* PLEASE WORK ALONE. If any plagiarism is found, you will get ZERO. Never hesitate to discuss with the instructor/TA if stuck in any assignment problem.

**Problem 1.** (Lastname\_Lab3\_p1.cpp) [**25 points**] Write a program to compute and display a programmer’s weekly salary as determined by the following expressions: If the number of hours worked is less than or equal to 40, the person receives $80 per hour; otherwise, the person receives $3200, plus $100 for each hour worked over 40 hours. The program should request the hours worked as input and should compute and display the salary as output.

**Problem 2.** (Lastname\_Lab3\_p2.cpp) [**25 points**] Write a C++ program that accepts a student’s numerical grade in a course and displays the letter grade according the table below.

|  |  |
| --- | --- |
| **Numerical Grade** | **Letter Grade** |
| Greater than or equal to 91 | A |
| Greater than or equal to 81 and less than 91 | B |
| Greater than or equal to 71 and less than 81 | C |
| Greater than or equal to 61 and less than 71 | D |
| Less than 61 | F |

**Problem 3.** (Lastname\_Lab3\_p3.cpp) **[25 points]** Write a program that asks the user to enter a U.S. dollar amount and then shows how to pay that amount using the **smallest number** of $100, $20, $10, and $5 bills. Following are a few test cases for your program:

Enter the amount for withdrawal: **125**

Please collect your bills as follows:

$100: 1

$20: 1

$5: 1

Enter the amount for withdrawal: **75**

Please collect your bills as follows:

$20: 3

$10: 1

$5: 1

Enter the amount for withdrawal: **94**

The amount cannot be withdrawn.

**Note:** Be sure to use integer values throughout, not floating-point numbers. Please also note the output format.

**Problem 4.** (Lastname\_Lab3\_p4.cpp) [**25 points**] Write a C++ program that accepts three sides (a, b, and c) of a triangle and a user choice (ch) for computation. Following are the choices for computation that you need to implement using switch-case:

|  |  |
| --- | --- |
| **User Choice** | **Computation** |
| 0 | Display the type of triangle based on sides, i.e. equilateral, isosceles, or scalene |
| 1 | Perimeter of triangle: P = a+b+c |
| 2 | Area of the triangle using the formula:, s = (a+b+c)/2 |
| Others | Invalid choice |

Your program should also check whether the triangle is possible for the given sides. In a triangle, the sum of the lengths of ***any*** two sides must be greater than the length of the third side and all the sides must be non-zero. If these conditions are not satisfied then the inputs are not valid for a triangle. Use integer for sides and double for area.