ECCS 1611 – Programming 1

PreLab 2 – Calculations

In your teams, discuss the following problem statement:

You own Honest Abe’s Split Rail Fence Company, which installs split-rail wooden fencing for landscapers. They tell you how many feet of fencing they need, and you give them a quote for how much your company will charge. As part of that quote, you need to know how much the materials cost.

As not all needed information is provided, your group first needs to develop a list of questions. *Possible questions (with answers):*

* *How many rails are used in a fence? 3*
* *How long is a rail? 10 feet*

*– ASSUME REQUESTS IN MULTIPLES OF 10*

* *What is the cost of a post? $10.98*
* *What is the cost of a rail? $9.97*

Figure out answers to all of your questions (or collectively make up answers you are all going to use). **Collectively** do the following:

* Write the pseudocode needed to solve this problem.

**Get number of feet of fence desired**

**Divide number of feet by rail length to get number of sections**

**Multiply number of sections by rails per section to get total number of rails**

**Add one to number of sections to get number of posts**

**Calculate rail cost by multiplying number of rails by cost per rail**

**Calculate post cost by multiplying number of posts by cost per post**

**Calculate cost of materials by adding rail cost and post cost**

* Identify the variables (and their data type) to be used in the program
* fenceLength - integer containing length of fence to install
* sections - integer indicating number of rail sections
* rails - integer containing total number of rails
* posts - integer containing total number of posts
* RAILS\_PER\_SECTION - integer indicating number of horizontal rails
* COST\_PER\_POST - float/double constant specifying price per post
* COST\_PER\_RAIL - float/double constant specifying price per rail
* materialsCost - float/double specifying cost of rails and posts
* Identify your test data: determine two inputs and calculate the answer for each.

10 feet - 2 posts 3 rails ANSWER: $51.87

100 feet - 11 posts 30 rails ANSWER: $419.88

Next, each student is to individually write a C++ program that implements the developed pseudocode and tests the solution with the team’s test data. When you’re certain that your solution works, please demonstrate it to your group members. Compare answers. Help those having difficulties.

**Group 14 – Dominic, Devin, Bryan**

**Questions:**

* How many rails are used in a fence? **4**
* How long is a rail? **15**
  + **All requests are in multiples of 15**

//We’ve factored in labor cost/profit into the costs of the posts and rails

* What is the cost of a post? **$16**
* What is the cost of a rail? **$20**
* How long is the fence? **Variable, depends on quote**

//No extra posts are needed for corners

**Pseudocode:**

1. Get user input to determine the length of the fence
2. Determine the number of posts needed [equal to (total length / rail length) + 1]
3. Determine the number of rails needed [(posts – 1) \* rails per section]
4. Calculate total cost of rails [rails \* railCost]
5. Calculate total cost of posts [posts \* postCost]
6. Calculate total cost [totalRailCost + totalPostCost]

**Variables:**

* totalLength
* postsNeeded
* railsNeeded
* RAIL\_COST
* POST\_COST
* totalRailCost
* totalPostCost
* totalCost

**Test Cases:**

* 15 feet, total cost of $112.00
* 90 feet, total cost of $592.00