**CS 2060 Programming with C - Fall 2017**

**Assignment #4**

Due Date: Sept 27, 2017 at 9:25am (MW class), Sept 28, 2017 at 9:25am (TR class)

Purpose: Learn to use if statements, while loops, and for loops together

Effort: Individual

Points: 100

Deliverables: Upload the .c source code file to Blackboard by due date.

Please include pseudocode in the comments at the beginning of your code.

**Please hand in a hardcopy version of your code at beginning of class.**

**Assignment Description**

Write a program to simulate a simple self-serve gas station with one gas pump that provides:

* Two grades of fuel: Regular and Diesel
* Accepts a discount card
* A car wash with two options
* A receipt

**Specifications**

1. Create a C project called **Assignment4 (please use this exact name)**
2. Follow "CS2060 Programming Assignments Policy"
3. Use correct data types and constants where possible (see p.220 for example of constant)
4. To simulate the gas pump 3 things must occur:

* First provide a setup mode
  + This simulates the store setting the price for Regular and Diesel fuels
* Second provide a customer mode
  + Infinite loop that waits for the next customer
  + When customer arrives, ask for the following:
    - Discount card? (Y/N)
      * If customer has a discount card, reduce fuel cost by $0.03 per gallon
    - Car Wash? (Y/N)
      * If customer wants a car wash then ask them what kind of car wash
        + Basic for $2.00
        + Premium for $5.00
    - Credit card
      * We need to fake the process of scanning a credit card!
      * Ask for zip code and ***assume*** customer swiped credit card
    - Fuel grade? (Regular/Diesel)
    - Receipt? (Y/N)
      * + If customer wants a receipt, it must contain:

number of gallons

price per gallon

fuel cost

car wash cost and car wash code if selected car wash

total cost

* + Display fueling mode like a regular gas pump does
    - Generate a random number to represent the number of gallons the customer pumps. **See section 5.10 and 5.11 of your book to seed rand properly.**
    - Set the max number of gallons to 30.
    - Pump the exact number of gallons that is returned from random function.
* Third, provide a way to shut down the pump and print a report.
  + Essentially, we need a way to stop the infinite customer loop. We’ll call this shutting down the gas pump. Perform these steps to accomplish pump shutdown:
    - When prompting for a discount card, customers can enter values of ‘**Y**’ or ‘**N**’.
    - To shut down the pump, the owner will enter a ‘**Q**’. This is the backdoor.
    - To verify it’s the owner, ask for the shutdown pin.
    - Use **2445 as the shutdown pin**.
    - After the ‘**Q**’ and **correct pin** are entered, exit the customer loop and create a report showing:
      * Total number of gallons dispersed for **all customers**
      * Total sales for **all customers** (fuel costs only, do not include car washes)

1. The code must handle user validation for the different user selections. When invalid input is entered, repeat same question until a valid value is entered. Check input on:
   * Fuel prices
   * Discount card input
   * Car wash input and type of car wash input
   * Fuel grade
   * Receipt

For the Y/N questions, handle uppercase and lower-case values. See output for examples.

**Tips**

* Issues with **scanf** and reading character input:
  + When using **scanf** with character input, put a space in front of the %c

**printf** ("Do you have a discount card? (Y/N) ");

**scanf** (" %c", &yesNoInput);

* + A problem occurs because “Enter” is a character
  + %c causes scanf to read one character at a time and if a previous call to scanf did not consume the new line, a scanf with %c will read it because the new line is a character!
  + Remember this is not an issue when using %d or %f in scanf, just with %c
* If you want to try using functions there is plenty of opportunity to include functions. Using functions is **NOT** required since we won’t fully discuss functions before assignment is due.

**Output**

Your output may look similar to the following:

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Gas Station Pump 17 Setup

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Enter price of regular fuel: **2.49**

Enter price of diesel fuel: **2.59**

Are these the correct prices? **y**

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Welcome to Gas Station 2060

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Do you have a discount card? (Y/N) **y**

Scanning your discount card...

$0.03/Gallon Discount

Car wash? (Y/N) **y**

1 Basic Wash $2.00

2 Premium Wash $5.00

Enter cash wash type: **2**

Insert credit card

Enter zip code **80919**

Please Wait ... Authorizing ... ... ...

Lift nozzle and select grade - Regular (1) or Diesel (2): **1**

\*\*\*\*\*\*\*\*\*\*\*\*\* Fueling \*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\* $2.46 1 Gallons \*\*

\*\* $4.92 2 Gallons \*\*

\*\* $7.38 3 Gallons \*\*

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Receipt? (Y/N) **Y**

\*\*\*\*\*\*\*\*\*\* Receipt \*\*\*\*\*\*\*\*\*\*\*\*

Gallons: 3

Price/gallon: $2.46

Fuel cost: $7.38

Car wash cost: $5.00 (code: 1751)

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Total: $12.38

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Thank You for Your Business!

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Welcome to Gas Station 2060

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Do you have a discount card? (Y/N) **t**

Invalid input, do you have a discount card? (Y/N) **y**

Scanning your discount card...

$0.03/Gallon Discount

Car wash? (Y/N) **m**

Invalid input, car wash? (Y/N) **5**

Invalid input, car wash? (Y/N) **n**

Insert credit card

Enter zip code **80919**

Please Wait ... Authorizing ... ... ...

Lift nozzle and select grade - Regular (1) or Diesel (2): **0**

Invalid input, select grade - Regular (1) or Diesel (2) **3**

Invalid input, select grade - Regular (1) or Diesel (2) **2**

\*\*\*\*\*\*\*\*\*\*\*\*\* Fueling \*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\* $2.56 1 Gallons \*\*

\*\* $5.12 2 Gallons \*\*

\*\* $7.68 3 Gallons \*\*

\*\* $10.24 4 Gallons \*\*

\*\* $12.80 5 Gallons \*\*

\*\* $15.36 6 Gallons \*\*

\*\* $17.92 7 Gallons \*\*

\*\* $20.48 8 Gallons \*\*

\*\* $23.04 9 Gallons \*\*

\*\* $25.60 10 Gallons \*\*

\*\* $28.16 11 Gallons \*\*

\*\* $30.72 12 Gallons \*\*

\*\* $33.28 13 Gallons \*\*

\*\* $35.84 14 Gallons \*\*

\*\* $38.40 15 Gallons \*\*

\*\* $40.96 16 Gallons \*\*

\*\* $43.52 17 Gallons \*\*

\*\* $46.08 18 Gallons \*\*

\*\* $48.64 19 Gallons \*\*

\*\* $51.20 20 Gallons \*\*

\*\* $53.76 21 Gallons \*\*

\*\* $56.32 22 Gallons \*\*

\*\* $58.88 23 Gallons \*\*

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Receipt? (Y/N) **y**

\*\*\*\*\*\*\*\*\*\* Receipt \*\*\*\*\*\*\*\*\*\*\*\*

Gallons: 23

Price/gallon: $2.56

Fuel cost: $58.88

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Total: $58.88

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Thank You for Your Business!

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Welcome to Gas Station 2060

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Do you have a discount card? (Y/N) **Q**

To shut down pump 17 and get a report enter the pin **1234**

Invalid pin number, enter the pin **2445**

Shutting down...

Pump 17 has been successfully shut down

Total Gallons = 26

Total Sales = $66.26