**Unit 2:** Fundamental DataTypes & Decisions

Answer the questions and complete the programs in preparation for the end of Unit exam

**Review Questions:**

1. What is encapsulation? Why is it useful?
2. What is the *this* reference? Why is it used?
3. Suppose you want to extend the car viewer program given in the previous unit example code to show a suburban scene, with several cars and houses. Which classes do you need?
4. What is wrong with the following sequence of statements?

int mystery = 1;

mystery = mystery + 1;

int mystery = 1 – 2 \* mystery;

1. Write pseudocode for a program that reads a word and prints the first character, the last character, and the characters in the middle. For example, if the input word was “Harry”, the program would print H y arr.
2. Complete the following truth table by finding the truth values of the Boolean expressions for all combinations of the Boolean inputs p, q, and r

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **p** | **q** | **r** | **(p && q) || !r** | **!(p && (q || r))** |
| f | f | f |  |  |
| f | f | t |  |  |
| f | t | t |  |  |
| f | t | f |  |  |
| t | t | t |  |  |
| t | t | f |  |  |
| t | f | f |  |  |
| t | f | t |  |  |

**Exercises:**

1. Write a class SavingsAcount that is similar to the BankAccount class, except that it has an added instance variable *interest*. Supply a constructor that sets both the initial balance and the interest rate. Supply a method addInterest(with no eplicit parameter) that adds the interest to the account. Write a SavingsAccountTester class that constructs a savings account with an initial balance of $1000 and an interest rate of 10%. Then apply the addInterest method and print the resulting balance.
2. Write a program that displays the Olympic rings. Color the rings with the Olympic colors. Provide classes OlympicRing, OlympicRingViewer, and OlympicRingComponent
3. Write a program that prompts the user for two intergers and then prints
   1. The sum
   2. The difference
   3. The product
   4. The average
   5. The distance (absolute value of the distance)
   6. The maximum (largest of the two)
   7. The minimum (smallest of the two)
4. Write a program that reads in three integers and prints “in order” if they are sorted in ascending or descending order, or “not in order” otherwise. For example,
   1. 1 2 5 prints: in order
   2. 1 5 2 prints: not in order
   3. 5 2 1 prints: in order
   4. 1 2 2 prints: in order