**Sample Programming Challenges (for practice using if/else and switch statements) wk#5-6**

1. // Program Shell1 **(Shell1.cpp)** prints appropriate messages based on a

// grade read from the keyboard.

#include <iostream>

using namespace std;

int main ()

{

int grade;

cout << "Enter an integer grade between 50 and 100."

<< " Press return. " << endl;

cin >> grade;

if /\* TO BE FILLED IN \*/

cout << "Congratulations!" << endl;

if /\* TO BE FILLED IN \*/

cout << "Good Work!" << endl;

return 0;

}

1. When completed, program Shell1 should read an integer value and write an appropriate message. Fill in two Boolean expressions beside the if so that **"Congratulations" is written if the numeric grade is greater than or equal to 90** and **“Good work” is written if the numeric grade is great than or equal to 80 but less than**

**90**. We will run the program five times entering the following

values for grade: 50, 100, 80, 81, and 79

"Congratulations" is printed time(s) in the five runs. "Good work" is printed time(s) in the five runs.

2. Add another Boolean expression so that **"Average" is printed if the numeric grade is less than 80 but greater than 70**. We will run the program with the same data set listed above.

"Average" is printed time(s) in the five runs.

3. Change the Boolean expressions in 1 so that the program displays the final letter grades using the following cut-off points.

**>= 90 A**

**<90, >= 80 B**

**<80, >= 70 C**

**<70, >= 60 D**

**<60 F**

We will run the program with the sample data sets to test each Boolean expression

1. **Software Sales (software\_sales.cpp)**A software company sells a package that retails for $99. Quantity discounts are given according to the following table.  
   Quantity Discount  
   10—19 20%  
   20—49 30%  
   50—99 40%  
   l00 or more 50%  
   Write a program that asks for the number of units purchased and computes the total cost of the purchase.  
   *Input Validation: Make sure the number of units is greater than 0.*
2. **Math Tutor**Write a program that can be used as a math tutor for a young student. The program should display two random numbers (see sample random\_numbers.cpp) between 2 and 15 that are to be multiplied, such as:   
    15  
    x 12  
   The program should then wait for the student to enter the answer. If the answer is correct a message of congratulations should be printed. If the answer is incorrect, a message should be printed showing the correct answer.

// This program demonstrates random numbers, providing a "seed" calling the time function, and generating random numbers between 1 and 6. (random\_numbers.cpp)  
#include <iostream>  
#include <cstdlib> // Needed to use rand() and srand()  
#include <ctime> // Needed to "seed" the random number generator  
using namespace std;

int main()  
{ int num1, num2, num3; // These hold the 3 random numbers  
 unsigned seed; // Seed for the random number generator  
 int max\_value = 6;   
 seed = time(0); // Assigns a system-generated seed. ….alternatively, student can be prompted to enter a seed

// Set the random generator seed before calling rand()  
srand(seed);

// Now generate random numbers to an integer between 1 and max\_value and print three random numbers   
num1 = 1+ rand()% max\_value;  
num2 = 1+ rand()% max\_value;  
num3 = 1+ rand()% max\_value;  
cout << num1 << " " << num2 << " " << num3 << endl;  
return 0;  
}