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 CS111 Summer Term 1- Final 6/27/18

PART I Basic Questions A,B,C are required to be correctly answered to obtain a grade higher than C-. Part 1 Questions are worth 10 points each.

A)

```
// NumbersGreaterThan - loop through an array and return the number of elements
// that are greater than the number passed in
//int arr[] = { 1,2,3,4,5,6 };
// NumbersGreaterThan(arr, 6, 3) ==> 3
// NumbersGreaterThan(arr, 6, 0) ==> 6
// NumbersGreaterThan(arr, 6, 100) ==> 0
```

int NumbersGreaterThan(int numbers[], int Size, int greaterThanThis)

```
{
    int count = 0;
    for (int i = 0; i < Size; i++)
        if (numbers[i] > greaterThanThis)
            count++;
    return(count);
}
```

B)

```
// this function will return true or false depending on whether the search string is in the array of
// strings
// string arr[] = {"Fred","Josh","Kim"};
// ContainsString(arr,3,"Fred") ==> true
// ContainsString (arr,3,"Freddy") ==> false
```

bool ContainsString(string Strings[], int Size, string searchString)

```
{
    for (int i = 0; i < Size; i++)
        if (Names[i] == searchString)
            return(true);
    return(false);
}
```

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C)

```
// returns the sum of elements of an array of double
```

```
// double arr[] = {2.0,3.5,4.5};
```

```
// Sum(arr, int Size) ==> 10.0
```

double Sum(double arr[], int Size)

```
{  
    double sum = 0.0;  
    for (int i = 0; i < Size; i++)  
        sum += arr[i];  
  
    return(sum);  
}
```

PART I - FINAL

D)

```
// You are passed in an array of integers
```

```
// fill with random numbers where each number is less than max and greater than 0
```

```
// NOTE: Numbers can be repeated
```

```
// int arr[100]; RandomNumbers(arr, 100,7000)
```

void RandomNumbers(int arr[], int size,int max)

```
{  
    srand(time(0));  
    for (int i = 0; i < size; i++)  
    {  
        arr[i] = (rand() % (max - 1)) + 1;  
        cout << arr[i] << endl;  
    }  
}
```

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E)

```
// The following is the Fibonacci sequence which are the numbers 1, 1, 2, 3, 5, 8, 13, 21, 34,...
```

```
// The sequence starts with 1,1 each subsequent number is equal to the two previous numbers
```

```
// in the sequence
```

```
// So for example
```

```
// Fibonacci(1) == 1
```

```
// Fibonacci(2) = 1
```

```
// Fibonacci(3) = Fibonacci(2) + Fibonacci(1)
```

```
// Fibonacci(4) = Fibonacci(3) + Fibonacci(2)
```

```
// please write a recursive function int Fibonacci(int n) that will calculate any Fibonacci number
```

```
//in the sequence
```

```
int Fibonacci(int n)
```

```
{
```

```
    if ((n == 1) || (n == 2))
```

```
        return(1);
```

```
    return(Fibonacci(n - 1) + Fibonacci(n - 2));
```

```
}
```

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F)

```
// returns whether a string array shares a character with another string array
// char strArray1[10] = "ABCD";
// char strArray2[10] = "EFG";
// char strArray3[10] = "F";
// SharesChar(strArray1, strArray2) ==> false
// SharesChar(strArray2, strArray3) ==> true
```

```
bool SharesChar(char strArray1[], char strArray2[])
```

```
{
    int i = 0;
    while (strArray1[i])
    {
        int j = 0;
        while (strArray2[j])
        {
            if (strArray1[i] == strArray2[j])
                return(true);
            j++;
        }
        i++;
    }
    return(false);
}
```

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G)

```
// the following function returns whether a pwd is correct or not
// to be correct it must have at least one uppercase letter,
// one lowercase character, one special character, one number and it must also be minSize
// IsValidPassword("AbCd1!",4) ==> true
// IsValidPassword("AbCd1!",10) ==> false (password not long enough)
// IsValidPassword("AbCd1",4) ==> false (missing special character)
// I have coded the upper case check for you already
bool IsValidPassword(char pswd[], int minSize)
```

```
{
    char uChars[] = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";
    char lChars[] = "abcdefghijklmnopqrstuvwxyz";
    char sChars[] = "!@#$%*";
    char sNums[] = "1234567890";

    if (SharesChar(pswd, uChars) == false)
        return(false);

    if (SharesChar(pswd, lChars) == false)
        return(false);
    if (SharesChar(pswd, sChars) == false)
        return(false);
    if (SharesChar(pswd, sNums) == false)
        return(false);
    int size = 0;
    while (pswd[size])
        size++;

    if (size < minSize)
        return(false);

    return(true);
}
```

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H)

// EXTRA CREDIT

```
// returns a random password into the pswd array that is at least size minsize
// Finish the function below that creates a random pswd that has at least one of the
// following: uppercase, lowercase, special character, number, and is min size
// you must also use the strlen function that returns the number of characters in a // string
// for example strlen("AB") == 2
// the output can be "12345ABc!" or "AHY@c309Q"
```

//RandomPassword

void RandomPassword(char pswd[], int minSize)

```
{
    srand(time(NULL));
    int size = rand() % minSize + minSize;
    int pos = 0;
    char RequiredCharacters[4][100] = { "ABCDEFGHIJKLMNOPQRSTUVWXYZ",
                                         "abcdefghijklmnopqrstuvwxyz",
                                         "!@#$%*",
                                         "1234567890" };

    pswd[0] = '\0';

    while (IsValidPassword(pswd, minSize) == false)
    {
        pos = 0;
        while (pos < size)
        {
            // MISSING LINES
            int source = rand() % 4;
            pswd[pos] = srcs[source][rand() % strlen(srcs[source])];
            pos++;
        }
        pswd[pos] = '\0';
    }
}
```

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// Part II

// 4 points each

void f1()

{

int d = 1.0 * 2.9;

cout << d << endl; // Line 1

cout << d % 2 << endl; // Line 2

cout << d / 2 << endl; // Line 3

}

a) output of Line 1

2

b) output of Line 2

0

c) output of Line 3

1

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d,e,f) The following function f2, does not compile/work correctly

please fix (at least three things wrong)

ANSWER IN RED

```
void f2()
```

```
{  
    int i = 0;  
    char *ptr;  
    char[]str = "ABD";  
    while (str[i])  
        i++;  
    int i = 0; // declared twice  
  
    while (ptr[i]) // NOT INITIALIZED  
        i++;  
}
```


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g) What is the output of main below?

ANSWER 3 3.8 13.8 3

```
double i = 3.8;
void f1()
{
    cout << i;
    i += 10;
}

int main()
{
    int i = 3.5;
    cout << i;
    f1();
    f1();
    cout << i;

    return 0;
}
```

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h) What is the output of fOne

ANSWER 123456 6 12345

```
void PrintNumber(int number)
{
    cout << number << " ";
}

void PrintLastDigit(int number)
{
    cout << number % 10 << " ";
}

void fOne()
{
    int number = 1234567;
    for (int i = 0; i < 3; i++)
    {
        if (i % 2 == 0)
        {
            number /= 10;
            PrintNumber(number);
        }
        else
        {
            PrintLastDigit(number);
        }
    }
}
```