In class worksheet: Functions and variable scope

1) Identifying the side effect:

For each function identify the side effect.

```
var sum = 0;
function sumOfSquares(N){
   "use strict";
   var i;
   for(i = 0; i < N; i = i+1){
      sum = sum + i*i;
   }
   return sum;
}
```

Side Effect:

The function has the side effect of changing the global variable sum

```
function unsafeDraw(ctx,x,y){
   "use strict";
   var i;
   ctx.translate(x,y);

   for(i = 0; i < 10; i = i +1){
      ctx.beginPath();
      ctx.lineTo(i*10,0);
      ctx.lineTo(i*10,100);
      ctx.stroke();
   }
}
```

Side Effect:

The entire program is one big side effect. Translate moves the coordinate axis, and beginpath empties the drawing path. Those are two biggest side effects. We can undo the translate with save/restore, but we can't undo beginPath.

```
function domExample(elementName,N){
   "use strict";
   var element = document.getElementById(elementName);
   var S1 = "";
   var i;
   for(i = 0; i < N; i = i+1){
       S1 = S1 + "<br>";
   }
   element.innerHTML = S1;
}
```

Side Effect:

This function has a side effect of changing the .innerHTML of a shared object.

2) Variable scope and function call exercises:

Given the following functions and global variables:

```
//Inventory
var hasKey = false;
var hasPen = false;
function  storyElement1 (choice1, choice2){
    "use strict";
    var storyFragment = "";
    if(choice1 === "yes"){
       hasKey = true;
       storyFragment = "You pick up the key.";
    } else {
       hasKey = false;
       storyFragment = "You leave the key on the desk.";
    }

    if(choice2 === "yes"){
       hasPen = true;
       storyFragment = storyFragment+"You pick up the mighty pen.";
    } else {
       hasPen = false;
       storyFragment = storyFragment+"You leave the pen alone,"+
                       "if only it was a sword";
    }
    return storyFragment;
}

function storyElement2(choice1){
    "use strict";
    var storyFragment ="";
    if(choice1 === "yes"){
       if(hasKey){
          storyFragment = "You open the door.";
       } else {
          storyFragment = "You try opening the door," +
                          "but it is locked.";
       }
    } else {
       storyFragment = "You walk by a dark foreboding door." +
                       "You decide it is best to leave it alone";
    }
    return storyFragment;
}
//Main program
var story = "";
story = story + storyElement1("no", "yes");
story = story + storyElement2("yes");
```

What is the value of hasKey, hasPen, and story after the main program executes.
hasKey is false, hasPen is true
Story is the string `"You leave the key on the desk.You pick up the mighty pen.You try opening the door,but it is locked."`

3)Writing functions:

1)Write a function that that accepts two parameters, **m** and **n,** and calculates the sum from m to n.

```
function sumFromMtoN(m,n){
   "use strict";
   var sum = 0;
   var i = 0;
   for(i = m; i <= n; i = i+1){
      sum = sum +i;
   }
   return sum;
}
```

2)Write a function that that accepts 2 parameters, **numberToTest** and **factor** and returns the number of times **numberToTest** is divisible by **factor**.
For example: If **numberToTest** is 20 and factor is 2 then your function will return 2, because 20 is divisible by 2 twice.
If **numberToTest** is 15 and the **factor** is 4 then your function will return 0, because 15 is not divisible by 4

```
function numFactors(numberToTest, factor){
    "use strict";
    var n = 0;
    var temp = numberToTest;

    while(temp % factor === 0){
        n= n+1;
        temp = temp / factor;
    }
    return n;
}
```

3)Write a function that accepts 2 parameters **ctx** and **N**. Using **ctx**, your function should draw **N** squares along the x-direction or size 10px and spaced 20px apart.

```
function drawSquares(ctx, N){
     "use strict";
     var spacing = 20;
     var size = 10;
     var i;

     for(i = 0; i < N; i = i+1){
          ctx.fillRect(i*spacing, 0, size, size);
     }
```

```
}
```

4)Write a function that checks if a string contains any lowercased vowels. Return true if it does, false if it does not.

```
//Checks for a,e,i,o,u,
//I did this program the long way.
function hasLowercaseVowels(inputString){
   "use strict";
   var currChar;
   var countVowels = 0;
   for(i = 0; i < inputString.length; i = i +1){
       currChar = inputString.subString(i,i+1);
       if(currChar === "a" || currChar === "e" ||
          currChar === "i" || currChar ==== "o" ||
          currChar === "u"){

          countVowels = countVowels +1;
       }
   }
   if(countVowels !== 0){
       return true;
   }else {
       return false;
   }
}
```