Sample Questions for Test 1

1. Determine the value of the left hand side variable x after statements a) - j) are executed. If you believe the statement cannot be compiled due to a syntax error, indicate so and explain. Assume that variables a, b, x and k have been properly declared and given the following values:

\[
\begin{align*}
\text{int} & \quad k = -3; \\
\text{float} & \quad a = 5.5, b = 1.5, x;
\end{align*}
\]

[HINT: Assume statements are mutually independent, that is, the above values are assigned before the execution of a), before the execution of b), before the execution of c), etc. Make sure you use the precedence table carefully.]

a) \( x = a + b >= 6.5; \)

b) \( x = k != (\text{int}) (a - b); \)

c) \( x = b - k > a; \)

d) \( x = !(a == 3*b); \)

e) \( x = -k <= k+6; \)

f) \( x = !(!k); \)

g) \( x = a < 10 && a > 5; \)

i) \( x = (k=2) + (b=3.); \)

j) \( x = k=2 + b=3.; \)

k) \( x = (\text{int}) (a - b) - k; \)

2. Assume that variables x, y, z, k, and j are declared as follows:

\[
\begin{align*}
\text{int} & \quad x = 8, \quad y = 5, \quad z = 1, \quad k = 5, \quad j = 10;
\end{align*}
\]

Determine the output of each of the program segments below. Same declarations are in place for each segment.

\[
\begin{align*}
\text{S1:} & \quad \begin{align*}
\text{if (} & \text{x>y) if (y<z) k++; else j++; } \\
\text{printf(} & \text{“S1:%d %d”,k,j);} \\
\end{align*} & \quad \text{S2:} & \quad \begin{align*}
\text{if (} & \text{x>y) if (y<z) k++; else j++; } \\
\text{printf(} & \text{“S2:%d %d”,k,j);} \\
\end{align*} & \quad \text{S3:} & \quad \begin{align*}
\text{if (} & \text{x>y) } \\
\text{if (} & \text{y<z) k++; } \\
\text{else } & \text{j++; } \\
\text{printf(} & \text{“S3:%d %d”,k,j);} \\
\end{align*}
\end{align*}
\]
3. What is printed by the following code?
```
main(){
    int a=1, b=2, c=3;
    a+=b+=c;
    printf("%5d%5d%5d\n", a,b,c);
    { float b=4.0;
      static int c;
      a+=c=5*b;
      printf("%5d%5.1f%5d\n", a,b,c);
    }
    printf("%5d%5d%5d\n", a,b,c);
}
```

4. Following C function tests whether the string array has a specific property:
```
int test(char array[], int left, int right)
{
    if (left == right || left > right) return 1;
    else if (array[left] != array[right]) return 0;
    else
        return test(array, left + 1, right - 1);
}
```

Given the function calls below, determine the value returned by the function test (and assigned to ans):

a) `ans=test("Was it a rat I saw?", 0, 18);`
   The value of `ans` is ________________.

b) `ans=test("wasitaratisaw", 0, 12);`
   The value of `ans` is ________________.

c) Explain shortly what property of array is tested by `test(char [], int, int)`. 

5. Assume the following declarations and initializations are provided:

```c
int *zPtr=NULL;
int *aPtr = NULL;
void *sPtr = NULL;
int number, i;
int z[5] = {1, 2, 3, 4, 5};
```

sPtr=z;

Find the error in each of the following program segments and explain why it is an error given the intended purpose of the code provided as a comment:

a. /* Pre-increment the first element of array z */
   
zPtr=z;
   ++zPtr;

b. /* use zPtr to get the first value in the array z into number */
   
zPtr=z;
   number = zPtr;

c. /* assign the third array element (indices start with 0) to number */
   
zPtr=z;
   number = *zPtr[2];

d. /* print entire array z */
   
zPtr=z;
   for (i=0; i<=5; i++)
      printf("%d", zPtr[i]);

e. /* Pre-increment the third element of array z */
   
   ++(z[0]+2);

6. Can two pointers that point to different arrays be meaningfully compared? Explain why yes or why no using the following example:

Example:

```c
int a[]={1, 2, 3}, b[]={1, 2, 3, 4};
int *aptr, *bptr;
------------------------
aptr=a; bptr=b;
if (aptr>bptr) printf("Does this make sense?");
```