CSC 111—Fall 2013
Quiz 5 Solutions

1. Consider the following expressions. Which one accesses the last element of an array called abc containing 100 elements?

   a. `abc[100];`
   b. `abc[99];`
   c. `abc{100};`
   d. `abc{last};`

2. Which of the following phrases describes this C declaration best?

   ```
   float* measures[250];
   ```

   a. 250 arrays each containing a pointer to a float
   b. An array of 250 pointers to floats
   c. A pointer to an array of 250 floats
   d. None of these phrases is appropriate

3. The following syntactically correct C code initializes an array buffer of size 16 with the char '#'. Which of the for loops below replaces all the array elements with an even index with the character '@' so that the array contains the following string "@#@#@#@#@#@#@#@#@#@#" afterwards.

   ```
   #define  LENGTH  (16)
   char buffer[LENGTH];
   int k;
   for (k=0;  k<LENGTH;  k++)  buffer[k] = '#';
   ```

   a. `for (k=0;  k< LENGTH;  k++)  buffer[k] = '@';`
   b.
   ```
   for (k=0; k<LENGTH; k++)
       if (k%2 == 0) buffer[k] = '@';
   ```
   c. `for (k=0; k<=LENGTH; k++) buffer[k] = '#@';`
   d. `for (k=0; k<LENGTH; k++) if (k%2 != 0) buffer[k] = '@';`

4. Which of the following code fragments correctly initializes an array b with all sevens?

   a. int b[10] = 7;

   b. int k, b[10]; for (k=0; k<10; k++) { b[k] = 7; }

   c. int b[10] = {7};

   d. int k, b[10]; for (k=0; k<10; k++) { b = 0; }

5. What is the output of following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
#define SIZE (3)

void func(float a[], int len) {
     int k;
     float first = a[0];
     for (k=0; k<len; k++){
          a[k] = a[k+1];
     }/*for*/
     a[len-1] = first;
}/*func*/

void printArray(float a[], int len){
     int k;
     for (k=0; k<len; k++){
          printf(" %0.1f", a[k]);
     }/*for*/
}/*printArray*/

int main(void) {
     float vec[SIZE];
     vec[0] = 3.3;
     vec[1] = 2.2;
     vec[2] = 4.4;
     func(vec, SIZE);
     printArray(vec, SIZE);
     return EXIT_SUCCESS;
}/* main */
```

   a. 3.3 4.4 2.2

   b. 3.3 2.2 4.4

   c. 2.2 4.4 3.3

   d. 3.3 2.2

6. Which of the following declarations correctly declares an array in the C programming language?

a.int arr[10];
b. int arr;
c. arr{10};
d. array arr[10];

7. What is the output of the following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
int main(void) {
   int arr[10], k;
   for(k=0; k<10; k++) {
        arr[k] = k;
        printf(" %d", arr[k]);
   }/*for*/
   return EXIT_SUCCESS;
}/*main*/
```

a. 0 1 2 3 4 5 6 7 8 9 10
b. 1 2 3 4 5 6 7 8 9 10
c. 0 1 2 3 4 5 6 7 8 9
d. 1 2 3 4 5 6 7 8 9

8. What is the purpose of the following C function?

```
void rigi(int* a, int* b) {
   int temp;
   if (*a > *b) {
        temp = *a;
        *a = *b;
        *b = temp;
   } /*if*/
} /*rigi*/
```

a. Swaps two integers
b. Check whether two integers to be equal
c. Sorts two integers into increasing order
d. Sorts two integers into decreasing order

9. The following program is supposed to read one line of text from a text file called “csc111.txt”. However, it does not work as expected. Identify the line number which has the error? Note that the number on the left of each line indicates the line.

```
1.     #include<stdio.h>
2.     #include<stdlib.h>
3.     #define MAX_LINE (100)
4.     int main(void){
5.           FILE *ifp;
6.           char line[MAX_LINE];
7.           ifp = fopen("csc111.txt",  "w");
8.           fgets(line, MAX_LINE,  ifp);
9.           printf("%s",  line);
10.         fclose(ifp);
11.        return EXIT_SUCCESS;
12.     }/* main */
```

a. 4

b. 7

c. 10

d. 6

10. What is the output of the following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
#define  x  (5+2)
int main(void) {
     int y;
     y = x*x*x;   // multiply
     printf("%d", y);
     return EXIT_SUCCESS;
}/*main*/
```

a. 27

b. 133

c. 2

d. 343

11. What is the output of the following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
#include <time.h>

#define MAX_RANGE (20)
#define MAX_NUM (10)
int main(void) {
     printf("Random number generator\n");
     int rn = 0;
     unsigned int seed = (unsigned int)time(NULL);
     srand(seed);

     int k = 0;
     while(k<MAX_NUM){
          rn = rand()% MAX_RANGE;
          printf("Random number: %d\n", rn);
          k = k+1;
     }/*while*/
     return EXIT_SUCCESS;
}/*main*/
```

a. Prints 10 random numbers

b. Prints 5 random numbers

c. 8 1 3 6 1

d. No Output Produced

12. What is the role of a Linker in programming environments?

a. to create a single executable file from multiple object files

b. to include text files specified by #include directives and substitute text specified by #define directives

c. to check the syntax of the program

d. to process the source code files (.c file) and then create an 'object' files (.o file)

13. What is the output of the following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
int main(void) {
     FILE* ofp;
     ofp = fopen ("CSC111.html",  "w");
     if (ofp == NULL) {
          printf ("Output file CSC111.html cannot be created\n");
          exit(EXIT_FAILURE);
     }
     fprintf (ofp, "<HTML>\n");
     fputs ("<BODY>\n", ofp);
     fputs ("<h1> HTML5 rocks </h1>\n", ofp);
     fputs ("</BODY>\n", ofp);
     fprintf (ofp, "</HTML>\n");
     fclose (ofp);
     return EXIT_SUCCESS;
} /*main*/
```

a. Output file CSC111.html cannot be created

b.
```
<HTML>
<BODY>
</BODY>
</HTML>
```

c. My First WebPage

d. An HTML file called CSC111.html that displays "HTML5 rocks" when loaded into a web browser

14. What is the effect of the following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
void printTopBottomLine() {
     printf("*****\n");
}/*printTopBottomLine*/
void printMiddleLine() {
     printf("*   *\n");
}/*printMiddleLine*/
void printBox() {
     printTopBottomLine();
     printMiddleLine();
     printMiddleLine();
     printMiddleLine();
     printTopBottomLine();
}/*printBox*/
int main(void) {
     printBox();
     printBox();
     printBox();
     return EXIT_SUCCESS;
} /*main*/
```

a. The program draws three boxes next to each other horizontally.
b. The program draws three boxes diagonally.
c. The program draws three boxes one after another vertically.
d. The program draws three middle and two bottom boxes.

15. Assume the following array declaration (i.e., an array called `course` that holds six characters).
`char course[6];`
What is the correct method to initialize this array so that it holds the characters of our course?

a. `course = "csc111";`
b.
```
course[0] = 'c'; course[1] = 's';
course[2] = 'c'; course[3] = '1';
course[4] = '1'; course[5] = '1';
```
c. `course[0] = 'csc111';`
d. `course[] = {'c','s','c','1','1','1'};`

16. What is the output of the following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
void spark(int A[]) {
   printf("A[0] = %d, A[1] = %d, A[2] = %d\n",
          A[0], A[1], A[2]);
   A[1] = 0;
} /*spark*/

int main(void) {
   int A[3] = {1, 2, 3};
   spark(A);
   printf("A[0] = %d, A[1] = %d, A[2] = %d\n",
          A[0], A[1], A[2]);
   return EXIT_SUCCESS;
} /*main*/
```

a. A[0] = 1, A[1] = 2, A[3] = 3
   A[0] = 1, A[1] = 2, A[3] = 3

b. A[0] = 1, A[1] = 2, A[3] = 3
A[0] = 1, A[1] = 0, A[3] = 3

c. A[0] = 1, A[1] = 0, A[3] = 3
   A[0] = 1, A[1] = 0, A[3] = 3

d. A[0] = 0, A[1] = 0, A[3] = 0
   A[0] = 0, A[1] = 0, A[3] = 0