CSC 111—Fall 2013
Quiz 7 Solutions

1. Which of the following code fragments properly accesses a `struct` field called `id` in the `struct Student` identified by variable `firstStudent` in the C programming language?

```
typedef struct {
      int id;
      float gpa;
      char name[20];
}  Student;
```

a.
```
struct Student firstStudent;
firstStudent.id = 12345;
```
b.
```
Student firstStudent;
firstStudent.id = 12345;
```
c.
```
Student firstStudent;
firstStudent->id = 12345;
```
d.
```
Student.firstStudent.id = 12345;
```

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

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#define MAX_SIZE (20)
typedef struct {
      int length;
       char str[MAX_SIZE ];
} StringDesc;

int main(void) {
      StringDesc  s;
      strcpy(s.str, "Enjoyed CSC111");
      s.length = strlen(s.str);
      printf("s.str[s.length-4] = %c\n", s.str[s.length]);
      return EXIT_SUCCESS;
 } /*main*/
```

a. `s.str[s.length-4] =  S`
b. `s.str[s.length-4] =  1`
c. `s.str[s.length-4] =  E`
d. `s.str[s.length-4] =  C`

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

```
#include <stdio.h>
#include <stdlib.h>
#define MAX  (5)

int main (void) {
     int a[MAX];
     int k;
     int* ip;
     for (k = 0; k < MAX; k++){
          a[k] = k;
          ip = a;
     } /*for*/
     printf("%d\n", *(ip + 3));
     return EXIT_SUCCESS;
} /*main*/
```

a. 2
b. 4
c. **3**
d. Garbage Value

4. Which line of code should be included at line 8 of this syntactically correct C function binarySearch? The function searches for val in sorted array a. Note that the number on the left of each line indicates the line number in the program and is not part of the program code.

```
1. #define NOTFOUND  (-1)
2. int binarySearch(int a[], int len, int val) {
3.      int first, last, middle;
4.      first = 0; last = len-1;
5.      while (first <= last) {
6.           middle = (first + last) / 2;
7.           if (a[middle] == val) return middle;
8.           /* missing code */
9.
10.               else first = middle+1;
11.     } /*while*/
12.     return NOT_FOUND;
13.     } /*binarySearch*/
```

a. `if (a[middle] < val) last = middle+1;`
b. `if (a[middle] > val) last = middle-1;`
c. `if (a[middle] < val) last = middle-1;`
d. `if (a[middle] > val) last = middle+1;`

5. Insert syntactically correct statements in the "missing code" assuming the following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
struct {
      int id;
      char *name;
      char *address;
} Person;
int main() {
      Person employee, *stptr;
      stptr = &employee;
      /* Missing code */
      /* Missing code */
      /* Missing code*/
      printf("Employee Information:\nID=%d\n%s\n%s\n",
            stptr->id,
            stptr->name,
            stptr->address);
      return EXIT_SUCCESS;
} /*main*/
```

a.
```
stptr.id = 1;
stptr->name = "Pratik";
stptr->address = "Agra,India";
```

b.
```
stptr.id = 1;
stptr.name = "Pratik";
stptr.address = "Agra,India";
```

c.
```
stptr->id = 1;
stptr.name = "Pratik";
stptr.address ="Agra,India";
```

d.
```
stptr->id = 1;
stptr->name = "Pratik";
stptr->address = "Agra,India";
```

6. Which of the following statements is `true`?
   a. Each component of a `struct` is assigned the same chunk of storage space.
   b. The syntax for structs is basically the same as for arrays.
   c. Each component of a struct is of same type
   d. Structs are also called records

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

```
#include <stdio.h>
#include<stdlib.h>
int main(void) {
/* assume memory addresses of p and j */
/* are 1000 and 2000 respectively */
     int p = 3;
     int *j;
     int *k;
     j = &p; k = j;
     printf("%d  %d  %d\n",  p,  *j,  *k);
     return EXIT_SUCCESS;
  } /*main*/
```

   a. `3 1000 2000`
   b. `3 3 3`
   c. `1000 3  3`
   d. None of the above

8. Given the struct type `Date` below, which of the following options initializes the `day` element of the variable `order_date` properly?

```
typedef struct {
       int day;
       int month;
   int year;
} Date;

Date order_date;
```

   a. `struct order_date.day ={9,};`
   b. `static order_date.day = "9";`
   c. `order_date.day ={9};`
   d. `order_date.day = 9;`

9. Insert syntactically correct print statements in the "missing code" assuming the following syntactically correct C program outputs the name, height and salary?

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

typedef struct {
     char *name;
     float height; // Centimeters
     float salary; // Thousand per year
} Employee;

void print(Employee *aEmp);

int main(void) {
     Employee joe;
     joe.name = "Joe";
     joe.height = 164.8;
     joe.salary = 110.8;
     print(&joe);
     return EXIT_SUCCESS;
}

void print(Employee *aEmp) {
     /*Missing Code */
     /*Missing Code */
     /*Missing Code */
}
```

a.
```
printf("Name: %s\n", aEmp->name);
printf("Height: %f\n", aEmp->height);
printf("Salary: %f\n\n", aEmp->salary);
```

b.
```
printf("Name: %s\n", aEmp.name);
printf("Height: %f\n", aEmp.height);
printf("Salary: %f\n\n", aEmp.salary);
```

c.
```
printf("Name: %s\n", aEmp->name);
printf("Height: %f\n", aEmp.height);
printf("Salary: %f\n\n", aEmp.salary);
```

d.
```
printf("Name: %s\n", name);
printf("Height: %f\n", height);
printf("Salary: %f\n\n", salary);
```

10. Suppose the name of the following program is "quiz.c". What is the console output of the following syntactically correct C program?

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>

#define fnam "quiz.c"
#define MAX (100)

int main(void) {
      FILE *ifp;
      char str[MAX];
      int k;
      int alphacount;
      int linecount;
      char ch;
      ifp = fopen(fnam, "r");
if (ifp == NULL) printf("Failed to open file %s\n", fnam);
      else {
            alphacount = 0;
            linecount = 0;
            while (fgets(str, MAX, ifp) != NULL) {
                  for(k=0; k<MAX; k++) {
                        ch = str[k];
                        if (ch == '\n') {
                              linecount++;
                              break;
                        } /* if */
                        if (!isalpha(str[k])) alphacount++;
                  } /* for */
                  alphacount++;
            } /* while */
      printf("Number of lines  in file = %d\n", linecount);
            fclose(ifp);
      } /* if */
      return EXIT_SUCCESS;
} /*main*/
```

a. Number of lines in file = 86

b. Number of lines in file = 15

c. Number of lines in file = 10

d. Number of lines in file = 36

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

```
#include <stdio.h>
#include <stdlib.h>
void multiply(int *a) {
     *a = 2**a;
} /*multiply*/

int main(void) {
     int x = 25;
     multiply(&x);
     printf("%d", x);
     return EXIT_SUCCESS;
} /*main*/
```

a. 25
b. 50
c. 0
d. 4587064

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

```
#include <stdio.h>
#include <stdlib.h>
void swap (int *x, int *y) {
     *x = *x+*y;
     *y = *x-*y;
     *x = *x-*y;
} /*swap*/

int main (void) {
     int a = 3;
     int b = 17;
     printf("a=%d b=%d ", a, b);
     swap(&a, &b);
     printf("a=%d b=%d\n", a, b);
     return EXIT_SUCCESS;
} /*main*/
```

a. a=17 b=3 a=3 b=17
b. a=3 b=17 a=17 b=3
c. a=3 b=17 a=3 b=17
d. a=17 b=3 a=17 b=3

13. Which of the following code fragments accesses a `struct` field called access in a `struct` identified by variable `z` in the programming language C?

a. `z-access`
b. `z->access`
c. `z>access`
d. `z.access`

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

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

void printBackwardUsingPtr(int *start, int size);

int main(void) {
     int myArray[] = {1,2,3,4,5};
     printBackwardUsingPtr(&myArray[4], 5);
     return EXIT_SUCCESS;
} /*main*/

void printBackwardUsingPtr(int *start, int size){
     int i=0;
     do {
          if (i==size-3){
               printf("%i\n", *start);
          }else{

               printf("%i, ", *start);
          }
          i++;
          start--;
     } while(i<size-2);
} /*printBackwardUsingPtr*/
```

a. `5, 4, 3, 2, 1`
b. `5, 4, 3`
c. `1, 2, 3, 4, 5`
d. `5, 4, 3, 2`

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

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
int main(void) {
     char csc [15];
     strcpy (csc, "csc 111 rocks");
     char *c1, *c2;
     printf("%s\n", csc);
     c1 = csc;   c1++;  *c1 = 'h';
     printf("%s\n", csc);
     c1--; *c1 = 't';
     printf("%s\n", csc);
     c2 = &(csc[2]); *c2 = 'e';
     printf("%s\n", csc);
     return EXIT_SUCCESS;
} /*main*/
```

a. csc 111 rocks
chc 111 rocks
thc 111 rocks
thx 111 rocks

b. csc 111 rocks
chc 111 rocks
thc 111 rocks
tec 111 rock

c. csc 111 rocks
chc 111 rocks
htc 111 rocks
the 111 rocks

d. csc 111 rocks
chc 111 rocks
thc 111 rocks
the 111 rocks