Questions

1. [8 marks] What is the output of the following syntactically correct C program?

8

```
1   #include <stdio.h>
2   #include <stdlib.h>
3   int main(void) {
4     int k = 67;
5     while (k > 47) {
6         printf("%d  ", k);
7         k = k - 7;
8     }/*while*/
9     printf("Finished\n");
10    return EXIT_SUCCESS;
11  } /*main*/
```

67 60 53 Finished

2. [8 marks] Write a syntactically correct C program that uses the formats %8s and %8d to output two strings and six integers vertically aligned as follows: Note: left column is left justified, and right column is right justified. No loops or extra functions are needed.

5

```
1   **Fruits Veggies*
2    1234567 2345678
3     34567 45678
4       567 678
```

```
#include <stdio.h>
#include <stdlib.h>
int main(void) {
  int numbers1= 1234567;
  int numbers2= 2345678;
  int numbers3= 34567;
  int numbers4= 45678;
  int numbers5= 567;
  int numbers6= 678;
  char* title1="**Fruits";
  char* title2= "Veggies*";

  printf("%8s %8s\n %8d %8d\n %8d %8d\n
  %8d %8d\n", title1, title2, numbers1,
  numbers2, numbers3, numbers4,
  numbers5, numbers6);
  return EXIT_SUCCESS;
} //main
```

3. [8 marks] What is the output of the following syntactically correct C program?

13

```
1   #include <stdio.h>
2   #include <stdlib.h>
3
4   void f4(void) { printf("f4: troubles\n"); }
5   void f2(void) { printf("f2: all my "); f4(); }
6   void f1(void) { printf("f1: yesterday\n"); f2(); }
7   void f3(void) { printf("f3: seem so far away\n"); f4(); }
8
```
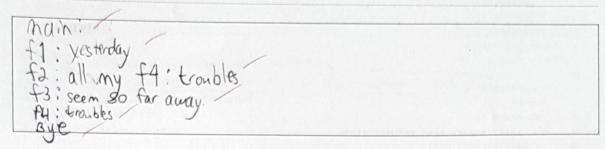
```
9   int main(void){
10      printf("main:\n");
11      f1();
12      f3();
13      printf("Bye\n");
14      return EXIT_SUCCESS;
15   }/*main*/
```

```
main:
f1: yesterday
f2: all my  f4: troubles
f3: seem so far away.
f4: troubles
Bye
```

4. [4 marks] Which one of the following is **NOT** a valid relational operator in the programming language C? Circle correct answer.

A. >=   B. !=   C. <   D. %=

5. [4 marks] Which of the following is not a valid type in the programming language C? Circle correct answer.

A. double   B. byte   C. float   D. int

6. [4 marks] Which of the following operators has the highest precedence in the programming language C? Circle correct answer.

A. ( )   B. *   C. %   D. *=

7. [8 marks] What is the output of the following syntactically correct C program?

```
1   #include <stdio.h>
2   #include <stdlib.h>
3   int main(void) {
4      int k = 21;
5      while (k < 35) {
6         if (k % 2 == 0)      → if even
7            printf("%d\n", k);
8         k = k + 3;
9      }/*while*/
10     printf("That is odd!\n");
11     return EXIT_SUCCESS;
12  } /* main */
```

21 24 27 30 33 36

```
24
30
That is odd!
```

8. [8 marks] What is the output of the following syntactically correct C program?

```
1   #include <stdio.h>
2   #include <stdlib.h>
3
4   void printLine(int count) {
5     int j = 0;
6     while (j<count) {
7       printf("#");
8       j = j + 1;
9     }/*while*/
10    printf("-\n");
11  }/*printLine*/
12
13  int main(void) {
14    int k;
15    int max = 7;
16    for (k=0; k<max; k++) printLine(k);
17    printf("Eureka!\n");
18    return EXIT_SUCCESS;
19  }/*main*/
```

1

Eureka!
Eureka!
Eureka!
Eureka!
Eureka!
Eureka!
Eureka!

9. [4 marks] Consider the following syntactically correct C program. How many function names appear in this program? Circle correct answer.

4

```
1   #include <stdio.h>
2   #include <stdlib.h>
3   int main(void) {
4     printf("CSC 111\n");
5     return EXIT_SUCCESS;
6   }
```

A. More than 2　　　　　B. 1　　　　　　　　C. 0　　　　　　　　(D. 2)

10. [8 marks] What are the values of the following C expressions? Circle correct answer. Assume the following C declarations and initializations:

```
1   int x = 7;
2   int a = 3;
```

(a) ((x*7)% 2)　　　　7.7 = 49/2　　R1

2

1

(b) (0>x || x>9)

2

False

2/9

(c) (x != 3)

> True

(d) (a += 2*(a - 19))   3-19 = -16 ·2 = -32 +3 = -29

> - 29

11. [4 marks] The C preprocessor (Circle correct answer)
    A. includes text files using `#include` and substitutes text using `#define` directives
    B. builds an application or an executable
    C. compiles C programs
    D. checks for semantic errors

12. [4 marks] Given the following two declarations and initializations, how do you store the value 17 into the integer variable z using pointer pz? Circle correct answer.

```
1   int z = 3;
2   int* pz = &z;
```

A. *pz* = 17;   B. *pz = 17;   C. pz* = 17;   D. z = 17;

13. [8 marks] How many valid identifiers are in each line according to C syntax? Note: comments are considered white space.

(a) Check   ~~for~~   C   Java   Fortran   ~~while~~   keywords   such   ~~as~~   _for   ~~long~~

> 6 X

(b) These   ~~/* are */~~   CPS   identifiers   ~~with~~   a   ~~// caveat~~   Oberon   Pascal

> 6 X

(c) XYZ   axYz   _system   B787   k   ~~711~~   ~~int~~   mega   ~~%d~~

> 6 ✓

(d) ~~99~~   four   17.6   IoT   ~~octal~~   k   modulo   output   ~~enter~~   IIoT   Ada

> 7 X