# King Saud University

**College of Computer and Information Sciences**
**Computer Science Department**

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|---|---|---|---|
| **Course Code** | **CSC 215** | | |
| **Course Title** | **Procedural Programming** | | |
| **Section No.** | | | |
| **Semester** | **Fall 2021** | | |
| **Exam** | **Midterm Exam I** | | |
| **Date** | **01/11/2021** | **Duration** | **60 minutes** |
| **Student Name** | | | |
| **Student ID** | | | |

| | | Relevant question | Full mark | Student mark |
|---|---|---|---|---|
| **CLO 1** | a) Apply knowledge of computing and mathematics appropriate to the discipline; | **1** | **10+1** | |
| **CLO 2** | b) Analyze a problem, and identify and define the computing requirements appropriate to its solution | **2** | **5** | |
| | | **3** | **5** | |
| **CLO 3** | c) Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs. | **4** | **5+1** | |
| **CLO 4** | i) Use current techniques, skills, and tools necessary for computing practice. | | | |

**Feedback/Comments:**

**For all questions, assume the size of the integer type and the address is 32-bits.**

**Question 1:** Copy your answer for each of the following questions to the table:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| **C** | **C** | **C** | **B** | **D** | **A** | **D** | **C** | **C** | **D** | **A** |

1. What is the meaning of using `static` before global variable declaration?

   **A.** `static` means nothing, the global variable is the same without the `static` keyword.

   **B.** the static variable does not need to be declared before its use

   **C. a**ccess to the variable is restricted to the file where it is declared

   **D.** static variable can be declared number of times but defined only once.

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2. What is the output of the following program ?

```
#include <stdio.h>
int main(){
  int x=2, y=5;
  if(x < y) return (x = x + y);
  else printf ("z1");
  printf("z2");
  return 0;
}
```

   **A.** `z2` **B.** `z1z2` **C.** None of the given **D.** Compilation error

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3. What will be the output of the following program?

```
#include <stdio.h>
int main(){
  int x = 20, y = 10;
  double z = x++ - y * 7 / --y + x * 10;
  printf("%.2f", z);
}
```

   **A.** `0.00` **B.** `20.00` **C.** `223.00` **D.** Compilation Error

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4. What is the output of the following segment?

```
int var1=1, var2=2, var3=3;
if(++var1 > var2++ || var1-- > 0)
var3++;
else
var3--;
printf("%d %d %d", var1, var2, var3);
```

---

**A.** 2 3 2 **B.** 1 3 4 **C.** 2 2 4
**D.** Compilation Error

5. What is the output of the following program ?

```
#include<stdio>
void foo(int n, int sum){
  int k=0, j=0;
  if (n == 0) return;
  k = n % 10;
  j = n / 10;
  sum = sum + k;
  foo (j, sum);
  printf ("%d,", k);
}
int main(){
  int a=2048, sum=0;
  foo(a, sum);
  printf ("%d", sum);
  return 0;
}
```

**A.** 8, 4, 0, 2, 14 **B.** 8, 4, 0, 2, 0
**C.** 2, 0, 4, 8, 14 **D.** 2, 0, 4, 8, 0

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6. What is the value of `j` at the end of the execution of the following C program?

```
int incr(int i){
  static int count = 0;
  count = count + i;
  return (count);
}
int main(){
  int i,j;
  for (i = 0; i <=4; i++)
    j = incr(i);
  return 0;
}
```

**A.** 10 **B.** 4 **C.** 6 **D.** 7

---

7. What is the output of the following program?

```
int fun(){
  static int num = 16;
  return num--;
}
int main(){
  for(fun(); fun(); fun())
```

```
    printf("%d ", fun());
  return 0;
}
```

**A.** Infinite loop
5 2

**B.** 13 10 7 4 1 **C.** 15 12 8

**D.** 14 11 8 5 2

8. What is the output of the following program?

```
#include<stdio.h>
int f(int n, int k){
  if (n == 0) return 0;
  else if (n % 2) return f(n/2, 2*k) + k;
  else return f(n/2, 2*k) - k;
}
int main(){
  printf("%d", f(20, 1));
  return 0;
}
```

**A.** 5 **B.** 8 **C.** 9 **D.** 20

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9. What is the value returned when calling the following function using `f(1)`?

```
int f(int n){
  static int i = 1;
  if(n >= 5) return n;
  n = n+i;
  i++;
  return f(n);
}
```

**A.** 5 **B.** 6 **C.** 7 **D.** 8

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10. Which one of the following expressions, when placed in the blank below, will NOT result in a type checking error?

```
void f(int, short);
void main(){
  int i = 100;
  short s = 12, *p = &s;
  __________ ;   // call to f()
}
```

**A.** `f(s, *s)`
`f(i,*s)`

**B.** `i = f(i,s)` **C.**

**D.** `f(i,*p)`

---

11. What is the value returned when calling the following function using `func(435)`?

```
int func(int num) {
  int count = 0;
  while(num){
    count++;
    num >>= 1;
```

---

```
    }
    return(count) ;
}
```

**A.** 9 **B.** 8 **C.** 0 **D.** 10

**Question 2:** For the following statements, give the corresponding outputs into the boxes which correspond to different spaces in the output.

**A.** `printf("%-4d%3d", 2, 4);`

| 2 | | | | | | 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**B.** `printf("%10.3e", 627.14);`

| | 6 | . | 2 | 7 | 1 | e | + | 0 | 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**C.** `printf("%7.2f", 0.888);`

| | | | 0 | . | 8 | 9 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**D.** `printf("%-5.2f %.2f", 5.0, 123.4);`

| 5 | . | 0 | 0 | | | 1 | 2 | 3 | . | 4 | 0 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**E.** `printf("%f%c%d", 23.12, '+', 15);`

| 2 | 3 | . | 1 | 2 | 0 | 0 | 0 | 0 | + | 1 | 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

Left margin of the console

**Question 3:** Answer the following questions:

**A.** What are the values of `x` and `y` after executing following statements:

```
int x=8, y=6;
x *= 3 - (--y)/3;
```

x = 16, y = 5

```
int x=2, y=3;
x *= (11>>1) - (y++);
```

x = 4, y = 4

**B.** Fill out the blanks in the following C program so it results in the shown output:

```
#include <stdio.h>
int main(){
  int i,j;
  for (i=0; i<10; i++) {
    if (i<5){
```

```
Output
*
**
***
****
*****
 ****
  ***
   **
    *
```

```
        for (.....j = 0....;.....j < i+1....;.....j++....) printf("*");
      } else{

          for (.....j = 0....;.....j < i-4....;.....j++....) printf(" ");

          for (.....j = 0....;.....j < 9-i....;.....j++....) printf("*");
      }
      printf("\n");
    }
    return 0;
}
```

**Question 4:** For each of the following, write a statement that performs the indicated task.

**A.** Define a symbolic constant `SIZE` that has a value 5 using `const` keyword.

```
....const int SIZE = 5;.....
```

**B.** Define an array named *numbers* with `SIZE` elements of type `float`.

```
....float numbers[SIZE];.....
```

**C.** Assign the value `3.44` to the second element in the array in section B.

```
....numbers[1] = 3.44;.....
```

**D.** Print the second array element with `1` digit of precision to the right of the decimal point.

```
....printf("%.1f", numbers[1]);.....
```

**E.** Declare a String named *str* and initialize it to literal value: **Summer**

```
char str[7]="Summer";/*char str[]="Summer";char* str="Summer";*/
```

**F.** Write the function prototype for a function called `Mid` that takes a String as a parameter and returns a pointer to the middle character in the String.

```
....char* Mid(char*);.....
```