King Saud University

College of Computer and Information Sciences
Computer Science Department

Course Code:	CSC 215
Course Title:	Procedural Programming
Semester:	Semester 2 of year 36/37
Exercises Cover Sheet:	**Midterm Exam**

Duration: 90 minutes

Student Name:	
Student ID:	
Student Section No.	

	Computer Science B.Sc. Program: NCAAA: Intended Learning Outcomes (ILO) Student Outcomes ABET: Program Learning Outcomes (PLO) Student outcomes	Question No. Relevant Is Hyperlinked	Covering %
NCAAA	**1. Knowledge (NCAAA)** **Suggested verbs (list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write)**	Exercise 1&2	20%
	(i) Use current techniques, skills, and tools necessary for computing practices; *The students learn how to use Integrated Development Environment to compile and run C programs. Students also learn the differences between procedural and object oriented languages*	Exercise 1&2	20%
NCAAA	**2. Cognitive Skills (NCAAA)** **Suggested verbs (estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise)**	Exercises 3,4,5,6&7	30%
ABET	b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution; *Students learn how to manage memory using dynamic memory allocation based on problem requirement analysis.*	Exercise 3&4	6%
	c. An ability to design, implement and evaluate a computer-based system, process, component or program to meet desired goals. *Students write procedural C programs.*	Exercise 4,5,6,&7	24%

Question1: Write True/ False   **(Total 10 points)**

Statement	True or False
The following statement increments the value of the variable that p points to by 1 *p ++;	
Arrays and pointers are intimately related in C and may be used interchangeably.	
If there are fewer initializers in the list than members in the structure, the remaining members are automatically initialized to 0 for primitive types.	
An array can store many different types of values.	
Structures can only contain variables of one data type.	
A function prototype declares the return type of the function. It also includes the number, type and order of the parameters the function expects to receive.	
Arrays are data structures consisting of related data items of the same type.	
The compiler ignores variable names mentioned in the function prototype.	

double num (){
  int n = 2;
  return n;
}
The above function involves implicit casting.	

In C, memory management is done automatically.	

Question 2: Select the correct answer   **(Total 10 points)**

1. A declaration "short int" is used for variables

    a) Which have a short duration in a program
    b) Which have short names
    c) Which may require less storage than normal integer
    d) All of the above.

----

2. The following lines, if included in a program will cause one of the following errors. Indicate the correct one

```
double c;
scanf("%c",c);
```

    a) runtime error
    b) compile time error
    c) typedef error
    d) no error

----

3. Which of the following cannot be checked in a switch-case statement?

    a) Character
    b) Integer
    c) Float
    d) Enum

----

4. Point out the error, if any in the for loop.

```
#include<stdio.h>
int main()
{
    int i=1;
    for(;;)
    {
        printf("%d\n", i++);
        if(i>10)
            break;
    }
    return 0;
}
```

    a) There should be a condition in the for loop
    b) The two semicolons should be dropped
    c) The for loop should be replaced with while loop.
    d) No error

----

5. Which of the following is the correct way to pass an entire array (arr) as a parameter to a function

   a) func(&array[2]);
   b) func(array);
   c) func(*array);
   d) func(array[size]);

----

6. Which of the following cannot be a structure member?

   a) Another structure
   b) Function
   c) Array
   d) None of the mentioned

----

7. If b is a pointer to a structure, which of the following accesses its member variable var.

   a)   b->var;
   b)   b.var;
   c)   b-var;
   d)   b>var;

----

8. Which of the following differences between malloc and calloc is not true?

a) malloc allocates number of bytes passed as argument
b) calloc allocates the product of number of elements and the size of each element, which are both passed as arguments.
c) both malloc and calloc return void*
d) both malloc and calloc initialize allocated memory to all 0

----

9. Which of the following is NOT an error when using free:
a)   Use free on a NULL pointer
b)   Use free on a pointer that has already been freed
c)   Use free on a memory address directly returned by malloc.
d)   Use free on a memory address that has been statically allocated

10. How many times the string is printed.

```c
#include<stdio.h>
int main() {
  int x;
  for(x = -1; x<=10; x++)
  {
    if(x < 5)
      continue;
    else
      break;
    printf("Welcome\n");
  }
  return 0;
}
```

a)   Infinite Times
b)   11
c)   0
d)   10

Question 3: Determine the output of the following: **(Total 4 points)**

A)

```c
#include <stdio.h>
int mystery( int a, int b );
int main( void ) {
    int a = 5; /* first integer */
    int b = 4; /* second integer */
    printf( "The result is %d\n", mystery( a, b ) );
    return 0;
}
int mystery( int a, int b ) {
    if ( b == 1 )
        {   return a;   } /* end if */
    else { return a + mystery( a, b - 1 ); } /* end else */
} /* end function mystery */
```

Output:

....

....

B)

```c
#include<stdio.h>
int main(){
  int i=2;
  printf( "The result is %d\n", i == (2*1) );
  return 0;
}
```

Output:

....

....

Question 4: For each of the following, write a statement that performs the indicated task. Assume that floating-point variables number1 and number2 are defined and that number1 is initialized. **(Total 4 points)**

a) Define the variable fPtr to be a pointer to a variable of type float.
b) Assign the address of variable number1 to pointer variable fPtr.
c) Print the value of the variable pointed to by fPtr.
d) Assign the value of the variable pointed to by fPtr to variable number2.

Answers:

a) ....

b) ....

c) ....

d) ....

Question 5: Determine the values of variables x and y after the following calculation is performed. Assume that x and y each have the value 5 when the statement begins executing. **(Total 2 points)**

x *= y++;

Answer:

. x = ...

. y = ...

Question 6: Write a statement or number of statements to answer the following questions: **(Total 10 points)**

a) Define a symbolic constant SIZE that has a value 10.

b) Define an array named *fractions* with SIZE elements of type double and initialize the elements to 0.

c) Assign the value 2.667 to array element nine.

d) Print array elements 6 and 9 with two digits of precision to the right of the decimal point.

e) Print all the elements of the array, using for loop.

Answers:

a) ....

....

b) ....

....

c) ....

....

d) ....

....

e) ....

....

....

Question 7: Write a statement or number of statements to answer the following:

(Total 10 points)

a) Write the function header for a function called trade that takes two pointers to double numbers as parameters and does not return a value.

Answer:

....

b) Define a structure called sub containing int variable subNumber and char array sub-Name with values that may be as long as 25 characters (including the terminating null character)

Answer:

....

c) Declare and dynamically allocate memory for an array of type *struct sub* and size 10:

Answer:

....

d) Define an enumeration data type that represents the basic colors (red, yellow, and blue).

Answer:

....