



No. of Pages : 2
No. Of Questions : 4
Examiner : Prof. Dr. Yasser Omar

Acad. Year : 2023/2024
Semester : Fall
Department : CS
Time Allowed : 120 Minutes
Date : 22/01/2024

Answer All Questions

CCS1302 Problem Solving and Programming (Final Exam)

(40 Points)

Question One

(8 Points)

- a. Identify the Error (Syntax, Runtime or Logical) and correct it

```
int x = 10;  
int y = 20;  
int *ptr;  
ptr = x;  
*ptr += y;  
printf("Value of x: %d\n", x);
```

*Syntax → no Compilation
Runtime → no running
logical → unexpected error*

- b. Show the error and correct it:

```
#include <stdio.h>  
int main() {  
    char *str = "Hello";  
    str[0] = 'M';  
    printf("%s\n", str);  
    return 0;  
}
```

- c. The following C program is intended to count the number of vowels in a string. However, it contains errors. Identify it and its type and correct them. (4 Points)

```
#include <stdio.h>  
int countVowels(char *str) {  
    int count = 0;  
    while (*str != '\0') {  
        if (*str == 'a' || 'e' || 'i' || 'o' || 'u') {  
            count++;  
        }  
        str++;  
    }  
    return count;  
}  
int main() {  
    char str[] = "Problem Solving and Programming";  
    printf("Number of vowels: %d", countVowels(str));  
    return 0;  
}
```

(12 Points)

Question Two

- a. Write a C function to reverse a string in place without using any built in function.
- b. Evaluate and explain the following expressions in C:
- i. `5 == 5.0`
 - ii. `1 && 0 || 1`
- c. Write a C function to swap two integers using call by reference.

Question Three

(6 Points)

Predict the output of the following C code snippets:

a.

```
#include <stdio.h>
int main() {
    int a = 5, b = 10;
    printf("%d\n", a++ + b);
    return 0;
}
```

b.

```
#include <stdio.h>
int main() {
    int x = 5;
    int y = x == 6 ? 10 : 20;
    printf("%d\n", y);
    return 0;
}
```

c.

```
#include <stdio.h>
int main() {
    char string[] = "Problem Solving";
    printf("%c\n", *(string+2));
    return 0;
}
```

Question Four

(14 Points)

- a. Write a C program that reads a text file: (data.txt) containing several lines of numbers (integers). The program should find and print the sum of the numbers on each line. Use `fscanf` to read from the file
- b. Write a C program that reads a string from the user and uses a function to check if it is a palindrome (a string that reads the same forwards and backwards).

Best Wishes