Quiz 2: Set A Solution

Introduction to Computing and Programming (CSD101)

Max. Marks: 15 **Date: 24-10-2024**

Duration: 30 min.

Name: _____ **Roll No. _____**

Note: Provide reasoning to all the MCQ type questions

1. What is the output of the following code snippet. (1 mark)

```
#include<stdio.h>
int main()
{
int x, *p;
x = 30;
p = x;
print("%d", *p);
return 0;
}
```

Solution:

*p = &x;

   a. 30
   b. Value of x
   c. Address of x
   d. Error

Solution: Address of x is not assigned in p so we cannot dereference. It will lead to error

2. What is the output of the following program? (2 marks)

```
#include <stdio.h>
int main() {
   char c[] = "ICRBCSIT17";
   char *p = c;
   printf("%s\n", c+p[3]-p[6]+9);
}
```

Solution:

A → 65
B → 66
I = 73

Output:
RBCSIT17
c is base address, ascii value of p[3] = 66, ascii value of p[6] = 73
base address – 7 + 9
base address + 2
so it will print all the character after 2nd position

3. The following program fragment results in (1 mark)

```
#include <stdio.h>
int main() {
```

Solution:

```
    int i =107, x = 5;
    printf((x>7)?"%d":"%c",i);
    return 0;
}
```

a. A compile time error
b. A syntax error
c. Printing of k
d. Printing of 107
e. None of these

Solution: Condition is false so k will be printed (char corresponding to ASCII value 107).

4. Consider the following program fragment (1 mark)

```
if (a>b)
if (b>c)
s1;
else s2;
```

Solution:

s2 will execute if

a. a<=b
b. b>c
c. b<=c and a<=b
d. a>b and b<=c

5. The following program outputs (1 mark)

```
#include <stdio.h>
void change(int);
int main() {
   int a = 4;
   change(a);
   printf("%d",a);}
   void change(int a)
   {printf("%d", ++a);}
```

Solution:

Answer: 54
As the value of a is not returned by the function so it will remain same as the initial value after the function call.

6. Write two differences between Macro and Inline function. Write a C program to calculate the **BMI using Macro** with proper syntax. Write a C program to calculate the **BMI using Inline** function with proper syntax. (4 marks)

```
#define BMI(weight, height) ((weight) / ((height) * (height)))


inline float calculateBMI(float weight, float height)
{ return weight / (height * height); }
```

Feature	Macro	Inline Function
Definition	Preprocessor directive (`#define`)	Function definition (`inline` keyword)
Type Safety	No type checking	Type-safe, function-like behavior
Compilation	Handled by preprocessor	Handled by the compiler
Debugging	Hard to debug (text substitution)	Easier to debug (like normal functions)
Side Effects	Possible due to multiple evaluations	No side effects, behaves like a function
Code Bloat	Can cause code duplication	Compiler optimizes inline code

7. Define two functions in C (**Note**: Do not write the whole program):
[a] A recursive function that calculates the sum of digits of a given integer. [2.5 marks]

```
int sum_of_digits(int n) {
    // Base case: when n is 0, return 0
    if (n == 0) {
        return 0;
    }

    if (n < 0) {
        n= -n;
    }

    // Recursive case: add the last digit to the sum of the
remaining digits
    return (n % 10) + sum_of_digits(n / 10);
}
```

If the return type is different and they have printed the value inside the function, please consider that as correct.

[b] A function that modifies the elements of an array by multiplying each element by 2 using ‘call-by-reference'. [2.5 marks]

```
// Function to multiply each element of the array by 2
void multiplyByTwo(int *array, int size) {
    for (int i = 0; i < size; i++) {
        array[i] *= 2; // Modify the element in place
    }
}
```

If the return type is different and they have printed the value inside the function, please consider that as correct.