Quiz 3: Set A

Introduction to Computing and Programming (CSD101)

Max. Marks: 15 **Date: 21-11-2024**

Duration: 30 min.

Name: _____ **Roll No. _____**

Q.1 struct node

```
{
  int i;
  float j;
};
struct node *s[10];
```

The above C declaration define 's' to be **(2 Marks)**

a) An array, each element of which is a pointer to a structure of type node

b) A structure of 2 fields, each field being a pointer to an array of 10 elements

c) A structure of 3 fields: an integer, a float, and an array of 10 elements

d) An array, each element of which is a structure of type node.

Solution: (a)

Q.2. What does the following statement mean? **Provide justification for your answer. (2 marks)**

```
int (*fp)(char*)
```

a. pointer to pointer
b. pointer to an array of chars
c. pointer to function taking a char* argument and returns an int
d. More than one of the above
e. None of the above

Solution: (c)

The correct answer is **pointer to function taking a char* argument and returns an int.**

Key Points

- One of the main characteristics of the function pointer is to pass the argument, and an argument can be returned from a function.
- **int (*fp)(char*)** defines that, a function pointer is declared as an integer type which is accepting a character type argument in the program.
- The main job of the function pointer is to store the initial part of the executable code.

Thus the correct answer is *pointer to function taking a char* argument and returns an int.*

Q.3. What is the use of function char *strchr(ch, c)? **Provide one line justification for your answer** **(1 mark)**

a) return pointer to first occurrence of ch in c or NULL if not present
b) return pointer to first occurrence of c in ch or NULL if not present
c) return pointer to first occurrence of ch in c or ignores if not present
d) return pointer to first occurrence of cin ch or ignores if not present

Solution: Answer: b

Explanation: The given code char *strchr(ch, c) return pointer to first occurrence of c in ch or NULL if not present

Q.4. **What is the output of the following program? Provide reasoning for the same. (2 marks)**

```
#include <stdio.h>

int main()  {

double a[3]={20.0,25.0,99.0},* p,* q;

p=a+1;

q=p++ ;

printf("%d,%d", (int) (q-p),( int)(* q-* p));

return 0;}
```

Solution: Solution:

First Expression: (int)(q - p)

- q points to a[1] (value 25.0), and p now points to a[2] (value 99.0).

- The expression q - p calculates the difference between the memory addresses of q and p. Since q points to a[1] and p points to a[2], this gives a difference of -1 (as p is after q in memory).
- Casting -1 to int gives -1.

Second Expression: (int)(*q - *p)

- *q is the value at q, which is 25.0 (the value of a[1]).
- *p is the value at p, which is 99.0 (the value of a[2]).
- The expression *q - *p computes 25.0 - 99.0 = -74.0.
- Casting -74.0 to int gives -74.

Q.5. Write 2 difference between calloc() and malloc()? Write the syntax for both calloc() and malloc(). **(4 marks)**

Solution:

S.No.	malloc()	calloc()
1.	A function that creates one block of memory of a fixed size.	A function that assigns a specified number of blocks of memory to a single variable.
2.	It only takes one argument	Takes two arguments.
3.	It is faster than calloc.	slower than malloc()
4.	It is used to indicate memory allocation	Used to indicate contiguous memory allocation
5.	Syntax : void* malloc(size_t size);	Syntax : void* calloc(size_t num, size_t size);
6.	It does not initialize the memory to zero	Initializes the memory to zero
7.	Does not add any extra memory overhead	Adds some extra memory overhead

Syntax of malloc(): void* malloc(size_t size);

Syntax of calloc(): void* calloc(size_t num, size_t size);

Q.6 Illustrate the working of selection sort with example. **(4 marks)**

Solution: If anyone has written the right code only, then also we will give full marks.

General situation :

Steps :

- **Find smallest element, mval, in x[k…size-1]**
- **Swap smallest element with x[k], then increase k.**