Quiz 3: Set B

Introduction to Computing and Programming (CSD101)

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

Duration: 30 min.

Name: ___________________________ **Roll No. ___________________________**

Q.1 Consider the declaration **(2 marks)**

int a =5, *b = &a; **Solution:**

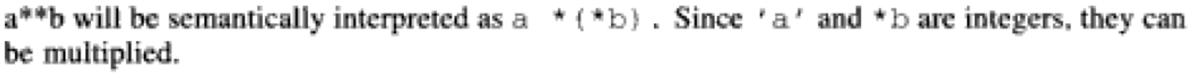
The statement prints

printf("%d", a ** b);

a. 25
b. Garbage value
c. 0
d. An error message

Provide justification for your answer.

Solution: a



ab will be semantically interpreted as** `a * (*b)` **. Since** `'a'` **and** `*b` **are integers, they can be multiplied.**

Q.2. Which code from the given option return pointer to last occurrence of c in ch or NULL if not present? **Provide one line justification for your answer.** **(1 marks)**

a. char *strchr(ch, c)
b. char *strrchr(ch, c) **Solution:**
c. char *strncat(ch, c)
d. char *strcat(ch, c)

Solution: Answer: b
Explanation: The function char *strrchr(ch, c) returns pointer to last occurrence of c in ch or NULL if not present.

Q.3. **What is the output of the following program? Provide reasoning for the same. (2 marks)**

```
 #include <stdio.h>
int main()  {
double a[2]={20.0,25.0},* p,* q;
p=a;
q=p+1 ;
```

printf("%d,%d", (int) (*p+4),(int)(* q+ * p));

return 0;}

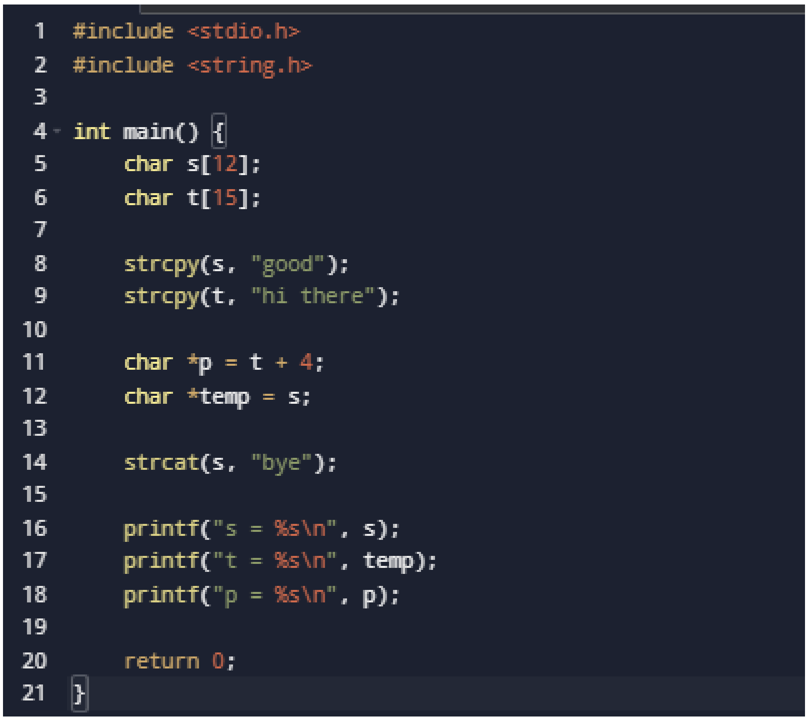
Solution: First value: (int)(*p + 4)

- *p = 20.0
- *p + 4 = 20.0 + 4 = 24.0
- Casting 24.0 to int gives 24.

Second value: (int)(*q + *p)

- *q = 25.0
- *p = 20.0
- *q + *p = 25.0 + 20.0 = 45.0
- Casting 45.0 to int gives 45.

Q.4. What will be the output of the following program? **Provide reasoning for your answer.** **(2 Marks)**



```c
#include <stdio.h>
#include <string.h>

int main() {
    char s[12];
    char t[15];

    strcpy(s, "good");
    strcpy(t, "hi there");

    char *p = t + 4;
    char *temp = s;

    strcat(s, "bye");

    printf("s = %s\n", s);
    printf("t = %s\n", temp);
    printf("p = %s\n", p);

    return 0;
}
```

Solution:

s = goodbye

t = goodbye

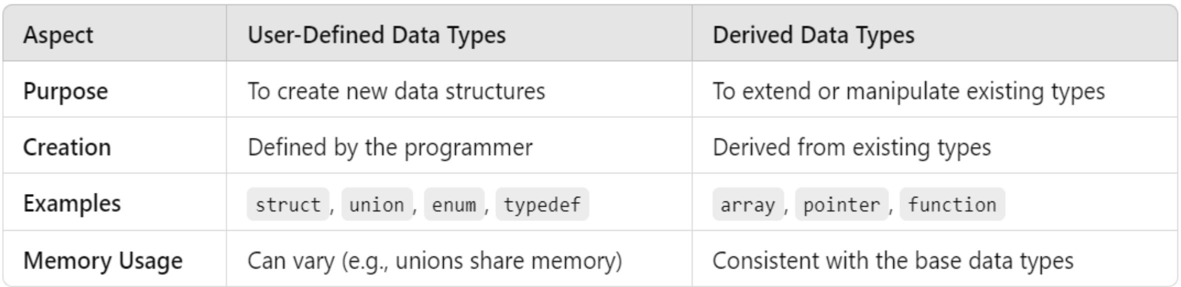
p = here

Explanation: t + 4 moves the pointer p to the 5th character of the t array (t[4]), demonstrating pointer arithmetic.

The strcat function is used to append a string to an existing string. temp and s point to the same array, so any changes made to s are reflected when accessing it via temp.

Q.5. Write 2 difference between structure and Union? Create the structure and union with students records of Student name, roll No. and ICP marks. **(4 marks)**

Solution:



Aspect	User-Defined Data Types	Derived Data Types
Purpose	To create new data structures	To extend or manipulate existing types
Creation	Defined by the programmer	Derived from existing types
Examples	`struct`, `union`, `enum`, `typedef`	`array`, `pointer`, `function`
Memory Usage	Can vary (e.g., unions share memory)	Consistent with the base data types

```
struct Student {

   char name[50];   // To store the student's name

   int rollNo;      // To store the roll number

   float icpMarks;  // To store ICP marks

};

union Student {

   char name[50];    // Student name

   int rollNo;       // Roll number

   float icpMarks;   // ICP marks

};
```

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

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

For any unsorted list:

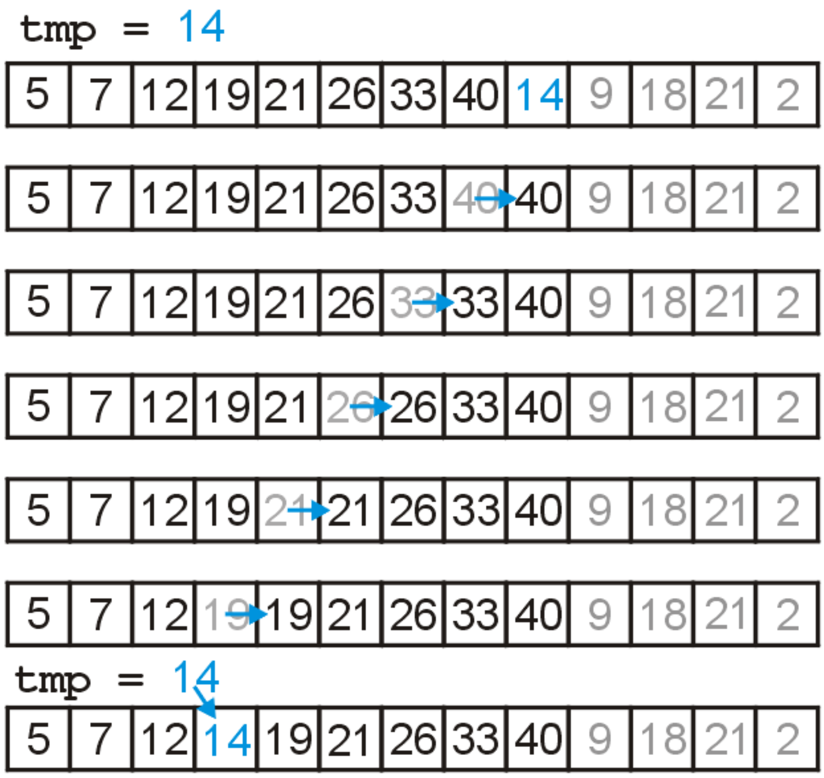
- Treat the **first element** as a sorted list of size 1

Then, given a sorted list of size *k* – 1

- Insert the *k*th item in the sorted list

The sorted list is now of size *k*

Swapping is expensive, so we could just temporarily assign the new entry


tmp = 14
5 7 12 19 21 26 33 40 14 9 18 21 2
5 7 12 19 21 26 33 40 40 9 18 21 2
5 7 12 19 21 26 33 33 40 9 18 21 2
5 7 12 19 21 26 26 33 40 9 18 21 2
5 7 12 19 21 21 26 33 40 9 18 21 2
5 7 12 19 19 21 26 33 40 9 18 21 2
tmp = 14
5 7 12 14 19 21 26 33 40 9 18 21 2