

Quizzes on the C Language

Part I: Show the output of each of the following programs. Assume that the programs are run on a 32-bit machine.

Q 1:

```
main(){
    printf("%d \n", 5>>2);
    printf("%d \n", -5>>2);
    printf("%d \n", (unsigned int)0xffffffff>>30);
    printf("%d \n", 2 & 5);
    printf("%s \n", (2 > 5 ? "bt" : "lt"));
}
```

Q2:

```
main(){
    int i = 1;

    switch (i){
        case 0: i -= 2;
        case 1: i--;
        case 2: i++;
        case 3: i += 2;
    }
    printf("i=%d\n",i);
}
```

Q3:

```
main(){
    int s = 0;
    int i = 7;

    for (;;) {
        s += i;
        if (i<=5) break;
        i--;
    }
    printf("s=%d\n",s);
}
```

Q4:

```
main(){
    printf("f=%d\n",f(3));
}
int f(int n){
    if (n==0) return 1;
    return n*f(n-1);
}
```

Q5:

```
typedef struct point {
    int x,y;
} Point,*PtrPoint;

main(){
    Point p1;
    Point p2;

    int a[]={1,2};

    p1.x = 1; p1.y = 2;
    p2.x = 1; p2.y = 2;

    f(p1,a,&p2);

    printf("p1.x=%d\n",p1.x);
    printf("p1.y=%d\n",p1.y);
    printf("a[0]=%d\n",a[0]);
    printf("a[1]=%d\n",a[1]);
    printf("p2.x=%d\n",p2.x);
    printf("p2.y=%d\n",p2.y);
}

f(Point p, int a[],PtrPoint ptr){
    p.x = 3; p.y = 4;
    a[0] = 3; a[1] = 4;
    ptr->x = 3; ptr->y = 4;
}
```

Part-II: Write each of the following functions in C/C++:

- `int sum(int a[], int n)`: Return the sum of the elements in a given array a of size n.
- `int sorted(int a[], int n)`: Test if a given array a of size n is sorted in ascending order.
- `void copy(int a[], int b[], int n)`: Make a copy of a given array a of size n into b. Assume that the size of array b is the same as a and the memory for array b has been allocated.
- `char tic_tac_toe(char board[][3])`: Given the configuration of a tic-tac-toe board, return the winner ('x' if 'x' wins, 'o' if 'o' wins, and 'd' if it's a draw).