

## BDCOM C programming language training Test

No: 20230713 (Test duration: 3 hours)

Note: If no operating system is specified in the question, the default is to run on a 64-bit operating system.

Part I: C language Conception(1 point per space, Total score 70)

### 1、 Conversion of number systems

Hexadecimal Numbers	Decimal Numbers	Octal Numbers	Binary Numbers
_____	239	_____	_____

2、

Define a binary number 15: int a = \_\_\_\_\_

Define an octal number 15: int b = \_\_\_\_\_

Define a hexadecimal number 15: int c = \_\_\_\_\_

3、

char array1[]={"I am a student"};                      strlen(array1) =

sizeof(array1) = \_\_\_\_\_

char array2[]="I am a student";                      strlen(array2) =

sizeof(array2) = \_\_\_\_\_

char \*array3 ="I am a student";                      strlen(array3) =

sizeof(array3) = \_\_\_\_\_

char \*array4[6]={"12345", "23456", "34567"};      sizeof(array4) = \_\_\_\_\_

4、

```
int a = 3, b = 2, c = 1;
```

```
if(a>b)
```

```
    a=c;
```

```
else;
```

```
    c=b;
```

```
if(a=b)
```

```
    b=c;
```

```
else
```

```
    b=3;
```

```
printf("a = %d, b = %d, c = %d.\n", a, b, c);
```

a = \_\_\_\_\_, b = \_\_\_\_\_, c = \_\_\_\_\_.

5、

```

unsigned char a = 200, b = 100, c = 0, d = 0;
c = a + b;
d = b - a;
printf("%d, %d, %d, %d.\n", a + b, c, b - a, d);

```

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

6、

```

int array1[10] = {1, 2, 3, 4, 5}; //Suppose the address of array1
is 0x8000
printf("%p, %p.\n", array1 + 1, &array1 + 1);

```

\_\_\_\_\_, \_\_\_\_\_.

7、

```

int x = 10;
test_fun()
{
    x++;

    return;
}
void main()
{
    int x = 3;

    test_fun();
    x--;
    printf("x = %d.\n", x);

    return;
}
x = _____

```

8、 a/b/c/d are all integer variables, d = (c = (a = 11, b = 22))  
 == 11; c = \_\_\_\_\_, d = \_\_\_\_\_

9、

```

char array2[2][5]={"abcde", "1234"};
char (*p2)[5] = array2;
printf("%s, %s, %s.\n", *p2, p2 + 1, *p2 + 1);

```

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

10、

```

char *array3[3]={"adh", "bei", "cfh"};
char **p3 = array3;
printf("%s, %s, %c, %c.\n", *p3 + 2, *(p3 + 2), **p3 + 2, **(p3 +

```

```
2));  
_____, _____, _____, _____.
```

```
11、  
char str1[20] = "abcd", str2[20] = "ABCD", str3[20]="xyz";  
strcpy(str3 + 2, strcat(str1 + 2, str2 + 1));  
printf("%s.\n",str3);  
_____.
```

```
12、 Spaces should be represented  
printf("%010.2f, %o, %8.3s, %x, %-05u %+05u.\n", 10.125, 9,  
"hello", 21, 39, 36);  
_____, _____, _____, _____, _____, _____.
```

```
13、  
unsigned char a = 0, b = 0, c = 0, d = 0;  
a = 7 ^ 3;  
b = 3 << 2;  
c = ~1;  
d = ~(a >> 1);  
printf("%u, %u, %u, %u, %u, %u.\n", a, b, c, a & b, a || b, d);  
_____, _____, _____, _____, _____, _____.
```

```
14、 Given following definitions in C program :  
#define S(a,b) a*b  
int area=S(3+1,3+4);  
what's the value of variable area_____.
```

```
15、 If variable a is int type , and we execute statement :  
a='A'+1.6; which following statement is correct(_____)  
A. variable a's value is char 'c'  
B. variable a's type is float  
C. float type variable can not add with char type variable  
D. variable a's value is char 'A' ASCII value add 1  
E. none of above is correct
```

```
16、  
void main(void)  
{  
    char*s = "hello";  
    char ch='a';  
  
    printf( "sizeof('a') = %u\n", sizeof( 'a'));  
    printf( "sizeof(*s+0) = %u\n", sizeof(*s+ 0));  
    printf( "sizeof(*s) = %u\n", sizeof(*s));  
}
```

```

printf( "sizeof(s) = %u\n", sizeof(s));

return;
}
sizeof('a') =_____ sizeof(*s+0) =_____ sizeof(*s) =_____
sizeof(s) = _____

```

17、 Describe the meaning of const in the following three statements

```

char * const p; _____
char const * p; _____
const char *p; _____

```

18、

```
int x = 3, y = 2, z = 3;
```

```

z = x < y ? !x : !((x = 2) || (x = 3)) ? (x = 1): (y = 2);
x =_____, y =_____, z =_____.

```

19、

```

struct Test1
{

```

```

    int b;
    double c;
    long d;

```

```

}data, *p;

```

```
sizeof(data) =_____, mode of accessing domain b =_____
```

20、 Define the following using variable a:

a.An array of 10 pointers that point to an integer

b.A pointer to an array of 10 integers

c.A pointer to a function that takes an integer parameter and returns an integer

d.An array of 10 pointers that point to a function that takes an integer parameter and returns an integer

a. \_\_\_\_\_, b. \_\_\_\_\_, c. \_\_\_\_\_, d. \_\_\_\_\_.

21、

```

unsigned char *p1;
unsigned long *p2;
p1 = (unsigned char *)0x8000;
p2 = (unsigned long *)0x8000;
p1 + 5 =_____
p2 + 5 =_____

```

22、

```
void main(void)
```

```

{
    int a[5]={1,2,3,4,5};
    int * ptr=(int*)&a+1;
    printf("%d, %d",*(a+1),*(ptr-1));

    return;
}
*(a+1) _____ , *(ptr-1) _____

```

23、 \_\_\_\_\_ .

Differences between file operation a and a+\_\_\_\_\_

Differences between file operation w and w+\_\_\_\_\_

24、 What is the end-of-file marker? \_\_\_\_\_

Part II: Find errors(2 points per question, Total score 20)

Point out exactly where the error occurred and why

1、

```

void main(void)
{
    char str2[10];
    char* str1 = "0123456789";
    strcpy( str2, str1 );
    printf("%c\n", string);
    return;
}

```

2、

```

void test( int *p1,int *p2 )
{
    int *p;
    *p = *p1;
    *p1 = *p2;
    *p2 = *p;

    return;
}

```

3、

```

const int int_a = 1;
void main(void)
{
    const int int_b = 2;
    int *p = (int *)&int_a, *q = (int *)&int_b;

    *q = 3;
    *p = 4;
    printf("%d,%d\n", int_a, int_b);
    return;
}

```

```
}
```

4、

```
void main (void)
```

```
{
```

```
    char str1[] = "hello";
```

```
    char *str2 = "hello";
```

```
    str1[0] = 's';
```

```
    str2[0] = 's';
```

```
    return;
```

```
}
```

5、

```
void main(void)
```

```
{
```

```
    char a;
```

```
    char *str=&a;
```

```
    strcpy(str,"hello");
```

```
    printf(str);
```

```
    return;
```

```
}
```

6、

```
void main(void)
```

```
{
```

```
    char str2[10], str1[10];
```

```
    int i;
```

```
    for(i= 0; i< 10; i++)
```

```
    {
```

```
        str1= 'a';
```

```
    }
```

```
    strcpy(str2, str1);
```

```
    printf("%s\n", str1);
```

```
    return;
```

```
}
```

7、

```
void main(void)
```

```
{
```

```
    char ch1[20], *ch2;
```

```
    ch1 = "hello world.";
```

```
    strcpy(ch2, ch1)
```

```

        return;
    }
8、
void main()
{
    char buf[10] = {0};
    gets(buf);
    printf("%c\n", buf);

    return;
}
9、
void main(void)
{
    char *p = (char *)malloc(10);
    memcpy(p, "hello", strlen("hello"));
    printf("%s\n", p);

    return;
}
10、
void main(void)
{
    char buf[64] = {0};
    FILE *fp = fopen("r", "test.txt");
    fgets(buf, 64, fp)

    return;
}

```

### Part III: Programming and Algorithm(Total score 60)

- 1、 Define a macro swap(t, x, y) that interchanges two arguments of type t.(4')
- 2、 Write a program to find the number of 1s in the binary form of the number 369.(4')

Example, input: 6, ouput:2.

- 3、 Please describe a sort algorithm and give the code implementation.(6')
- 4、 Write a function that prints each number of an integer.(6')

Input int value:1234567, output:1 2 3 4 5 6 7.

```

void print(unsigned int x)
{
    ...
}

```

```

}

int main()
{
    unsigned int a = 1234567;

    print(a);
    return 0;
}

```

5. Enter the year, month, and day to calculate the day of the year it belongs to?(6')

Example, input: 2023-7-6, output: 187

6. Write a recursive version of function reverse(s), which reverses the string s in place.(6')

7. The C library function char \*strstr(const char \*src, const char \*sub) function finds the first occurrence of the substring needle in the string src. The terminating '\0' characters are not compared.(8')

Please implement your own version of strstr.

Example:

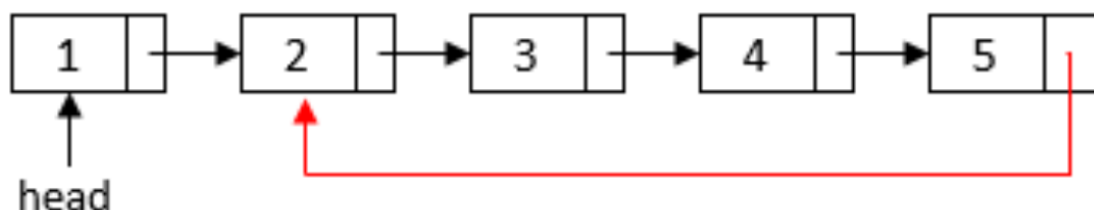
```

const char src[20] = "TutorialsPoint";
const char sub[10] = "Point";
char *ret = strstr(src, sub);
printf("The substring is: %s\n", ret); //The substring is: Point

```

8. Check if a linked list is Circular Linked List.(10')

In a regular linked list, the last element has no next element. Therefore, its next pointer field is null. However, in a circular linked list, the last element has a reference to one of the elements in the list:



Please give algorithm ideas and pseudocode implementation.

9. Write a function is to implement matrix multiplication.(10')

Let A be a matrix of m\*p and B be a matrix of p\*n, then the matrix C of m\*n is called the product of matrices A and B, denoted C=AB, where the element of the row i column j in matrix C can be expressed as:



$$(AB)_{ij} = \sum_{k=1}^p a_{ik} b_{kj} = a_{i1} b_{1j} + a_{i2} b_{2j} + \cdots + a_{ip} b_{pj}$$

Example

$$A = \begin{bmatrix} a_{1,1} & a_{1,2} & a_{1,3} \\ a_{2,1} & a_{2,2} & a_{2,3} \end{bmatrix}$$

$$B = \begin{bmatrix} b_{1,1} & b_{1,2} \\ b_{2,1} & b_{2,2} \\ b_{3,1} & b_{3,2} \end{bmatrix}$$

$$C = AB = \begin{bmatrix} a_{1,1}b_{1,1} + a_{1,2}b_{2,1} + a_{1,3}b_{3,1}, & a_{1,1}b_{1,2} + a_{1,2}b_{2,2} + a_{1,3}b_{3,2} \\ a_{2,1}b_{1,1} + a_{2,2}b_{2,1} + a_{2,3}b_{3,1}, & a_{2,1}b_{1,2} + a_{2,2}b_{2,2} + a_{2,3}b_{3,2} \end{bmatrix}$$