

1. مقدار تمام متغیر ها را پس از اتمام هر خط کد مشخص کنید. (هر کدام 5 نمره)

A)

```
int a = 20;          a=20
int b = --a * 2 + a++ / 3;    a=20 ,b=44
a %= 3;              a=2
```

B)

```
int p = 6, q = 4;      p=6 , q=4
p |= q;                p=6,q=4
int r = p ^ q;    r=2 , p=6 ,q=4
q &= r;      q=0 , r=2
```

C)

```
int x = 12, p;    x=12 , p= memory location
float y = 3.5;    y=3.5
int z = x / y;    z=3 , x=12 , y=3.5
x = x / z + z * y;    x=14 , z=3 , y= 3.5
z = (int) y / x;    z=0 , y=3.5 , x=14
p = (int) (x / y);    p=4
```

D)

```
int a = 3;      a=3
int b = a << 1;    b=6 , a=3
int c = !b + a;    c=3 , b=6 ,a=3
int d = c << 2 | !1;    d=12 , c=3
```

2. برای هر بخش، با گذاشتن پرانتز اولویت اجرا را نشان دهید و مقدار نهایی متغیر را به دست آورید. (هر کدام 5 نمره)

A)

```
int a = 5 | 12 & 3 + 8 * 2 - 7;  
a=13   int a = (5|(12&((3+(8*2))-7)))
```

B)

```
int b = 10 ^ 5 + 3 * 2 - 8 << 1;  
b=12   int b=(10 ^ (((5 + (3 * 2)) - 8) << 1))
```

C)

```
int c = 12 >> 3 & 5 + 7 ^ 3 * 2 - 1 | 8;  
c=13   int c= (((12 >> 3) & (5 + 7)) ^ ((3 * 2) - 1)) | 8)
```

3. حاصل متغیر result را در دو بخش زیر نوشته و توضیح دهید که این مقدار چگونه به دست آمده است. (هر کدام 10 نمره)

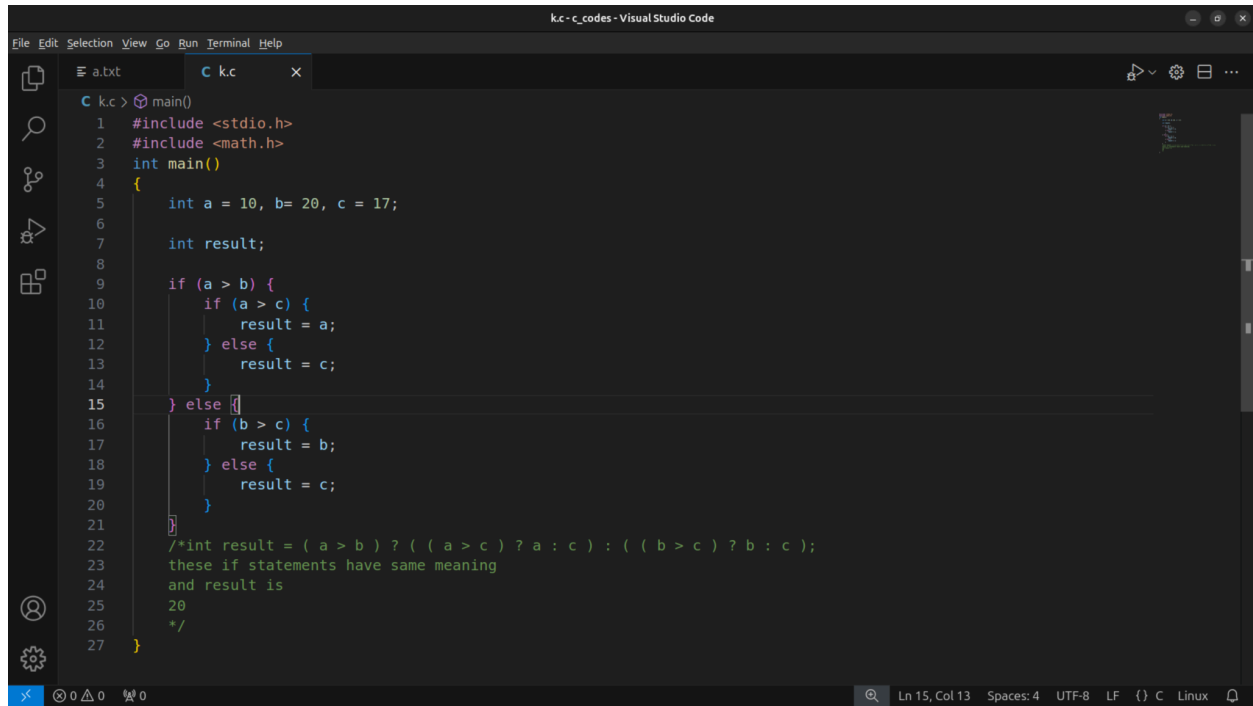
A)

```
int a = 10, b = 20, c = 17;  
int result = ( a > b ) ? ( ( a > c ) ? a : c ) : ( ( b > c ) ? b : c );   result=20
```

B)

```
int a = 17, b = 3, s = -6;  
int result = s ? ( ( a > b ) ? a - b : b - a ) : 0;   result=14
```

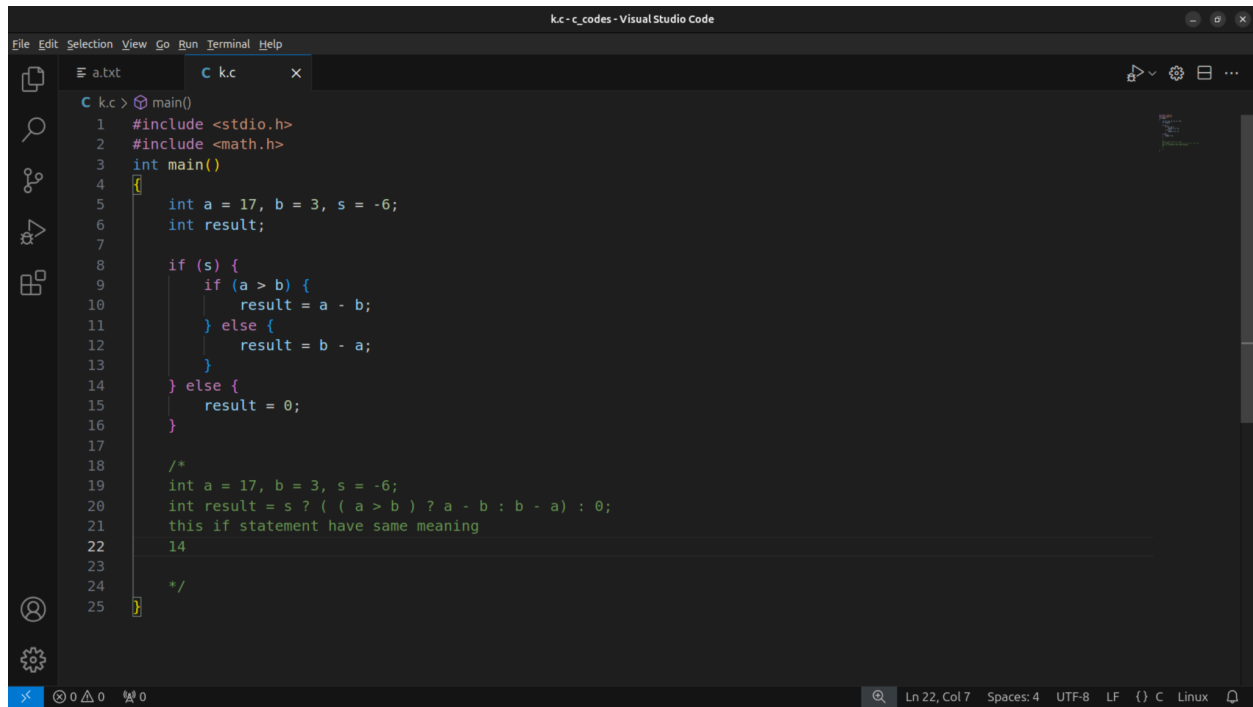
## توضیحات سوال ۳ الف :



```
k.c - c_codes - Visual Studio Code
File Edit Selection View Go Run Terminal Help
a.txt C k.c
C k.c main()
1 #include <stdio.h>
2 #include <math.h>
3 int main()
4 {
5     int a = 10, b = 20, c = 17;
6
7     int result;
8
9     if (a > b) {
10         if (a > c) {
11             result = a;
12         } else {
13             result = c;
14         }
15     } else {
16         if (b > c) {
17             result = b;
18         } else {
19             result = c;
20         }
21     }
22
23     /*int result = ( a > b ) ? ( ( a > c ) ? a : c ) : ( ( b > c ) ? b : c );
24     these if statements have same meaning
25     and result is
26     20
27     */
28 }
```

Ln 15, Col 13 Spaces: 4 UTF-8 LF {} C Linux

## توضیحات سوال ۳ ب :



```
k.c - c_codes - Visual Studio Code
File Edit Selection View Go Run Terminal Help
a.txt k.c
C k.c > main()
1 #include <stdio.h>
2 #include <math.h>
3 int main()
4 {
5     int a = 17, b = 3, s = -6;
6     int result;
7
8     if (s) {
9         if (a > b) {
10             result = a - b;
11         } else {
12             result = b - a;
13         }
14     } else {
15         result = 0;
16     }
17
18     /*
19     int a = 17, b = 3, s = -6;
20     int result = s ? ( ( a > b ) ? a - b : b - a ) : 0;
21     this if statement have same meaning
22     */
23
24     */
25 }
```

Ln 22, Col 7 Spaces: 4 UTF-8 LF {} C Linux

```
// question 4
a= INPUT INT
b= INPUT INT
littlest = 0
biggest=0
IF a>b THEN
    littlest=b
    biggest=a

ELSE
    littlest=a
    biggest =b
ENDIF
answer=0
for i=1 to littlest with 1 steps // for (i=1;i<=littlest;i+=1)
    IF littlest%i=0 AND biggest%i=0 THEN
        answer = i
    ENDIF
ENDFOR
print answer
```

```
//question 5
i= INPUT INT
j= INPUT INT
i_1=1
j_1=1
zero_counter=0
all_inputs = i*j
FOR i_1 to i with steps 1
    FOR j_1 to j with steps 1
        in = INPUT INT
        IF in=0 THEN
            zero_counter = zero_counter +1
        ENDIF
    ENDFOR
ENDFOR
print zero_counter
print FLOAT zero_counter/all_inputs
```

```
// question 6
number = INPUT INT
// i assume i can use logarithm and assume ^ means power for
example 2^4=16
INT num_count = (log10 number )+1
g=0
num_count_fix = num_count
FOR num_count to 1 with steps -1 //
for(num_count;num_count>0;num_count-=1)
    digit=0
    exponent_pow = num_count-1
    digit=(number/(10^exponent_pow))%10
    g=g+(digit^num_count_fix)
ENDFOR
IF g=number THEN
    print it is armstrong number
ENDIF
```