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 );
```

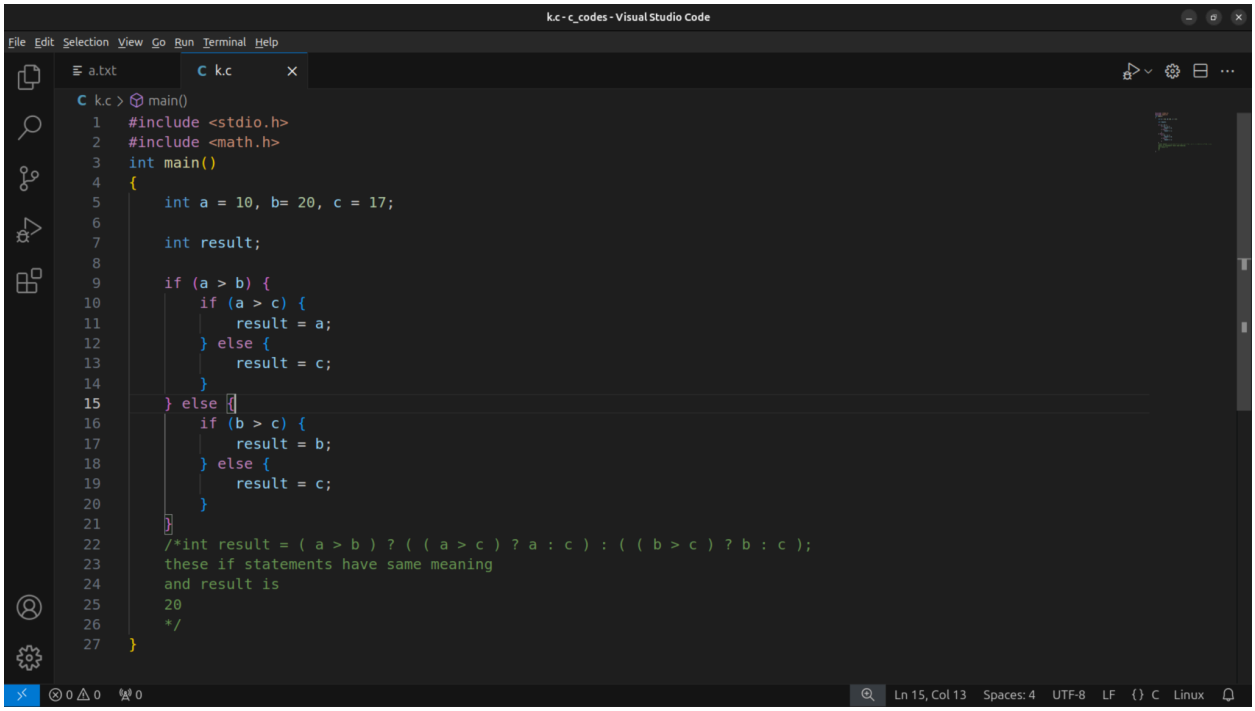
result=20

B)

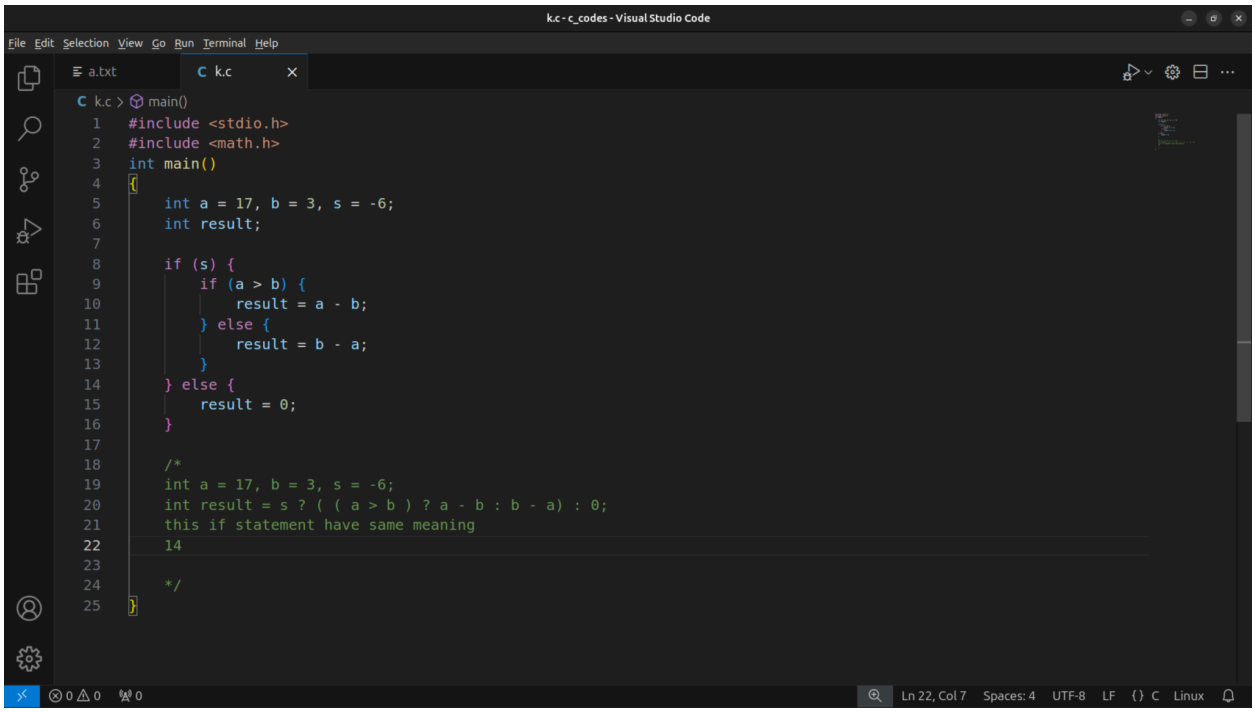
```
int a = 17, b = 3, s = -6;
int result = s ? ( ( a > b ) ? a - b : b - a) : 0;
```

result=14

توضیحات سوال ۳ الف :



توضیحات سوال ۳ ب :



```
// 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
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
        exponant_pow = num_count-1
        digit=(number/(10^exponant_pow))%10
        g=g+(digit^num_count_fix)
ENDFOR
IF g=number THEN
        print it is armstrong number
ENDIF
```