

## Laboratoriya ishi 2. Tarmoqlanish operatorlari.

**Ishning maqsadi:** Talabalarga tarmoqlanuvchi jarayonlar haqida malumot berish va ulardan dasturlashda foydalanish.

**Kerakli jixoz va vositalar:** kompyuter, proyektor

### Nazariy ma'lumot

Tarmoqlanuvchi jarayonni hisoblash yo'li ma'lum bir shartni bajarilishi yoki bajarilmasligiga qarab tanlanadi. Tarmoqlanuvchi jarayonlarni hisoblash uchun shartli operatoridan foydalaniladi. Shartli operatori ikki xil ko'rinishda bo'ladi:

- to'liq shartli operator;
- chala shartli operator.

Chala shartli operatorida shart rost xolatda operatorning 2 qismi ishga tushadi, agar shart yolg'on bo'lsa, operator turgan qatordan so'ngi qator ishlatiladi.

```
if (<shart>) {<operatorlar>;}
```

To'liq shartli operatorida shart rost xolatda operatorning 2 qismi ishga tushadi, agar shart yolg'on bo'lsa, 2 qismi ishga tushadi.

```
if (<shart>) {<operatorlar>;} else {<operatorlar>;}
```

### Amaliy qism:

Tarmoqlanuvchi jarayonlarni dasturlash uchun bir nechta misollarni ko'rib chiqamiz.

$$1\text{-misol. } Y = \begin{cases} ax + b & x > 1, \\ ax^2 + bx + c & x < 1, \end{cases}$$

$a=1, b=2, c=3$  ga teng bo'lgananiqlikda hisoblang.

```
int x,y; float a=1,b=2,c=3;
cout<<"x="; cin>>x;
if (x>=1){
    y=a*x+b;  cout<<"y="<<y<<endl;
}
else{
    y=a*x*x+b*x+c; cout<<"y="<<y<<endl;
}
```

2-misol. Butun son berilgan. Agar berilgan son musbat bo'lsa, 1 ga oshirilsin, aks xolda o'zgartirilmasin. Hosil bo'lgan sonni yekranga chiqaruvchi dastur tuzilsin.

```
int a;
cout<<"a="; cin>>a;
if (a>0)
{
    cout<<"birga oshirilsin \n"<<a+1<< endl;
}
else
{
    cout<<"o`zgartirilmasin \n"<<a<< endl;
}
```

Natija:1

```
a=2
birga oshirilsin
3
```

Natija:2

```
a=-5
o`zgartirilmasin
-5
```

3- misol. Butun son berilgan. Agar berilgan son musbat bo'lsa, 1 ga oshirilsin, agar manfiy bo'lsa 2 ga kamaytirilsin. Agar 0 ga teng bo'lsa 10 ni o'zlashtirsin. Hosil bo'lgan sonni yekranga chiqaruvchi dastur tuzilsin.

Dastur kodi:

```
int a;
cout<<"a="; cin>>a;
if (a>0){
    cout<<"birga oshirilsin \n"<<a+1<< endl;
}
if (a<0){
    cout<<"ikkiga kamaytirilsin \n"<<a-2<< endl;
}
if (a==0){
    cout<<"o`nni o`zlashtirsin\n"<<10<< endl;
}
```

Natija:1

```
a=6
birga oshirilsin
7
```

Natija:2

```
a=-10
ikkiga kamaytirilsin
-12
```

Natija:3

```
a=0
o`nni o`zlashtirsin
10
```

4-misol. Uchta son berilgan. Shu sonlar orasida nechta musbat son borligini aniqlovchi dastur tuzing.

Dastur kodi:

```
int a,b,c;
cout<<"a="; cin>>a;
cout<<"b="; cin>>b;
cout<<"c="; cin>>c;
if (a>0 && b>0 && c>0)
{cout<<"Uchta musbat son \n"<< endl;}
```

```

if (a<0 && b>0 && c>0)
    {cout<<"ikta musbat son \n"<< endl;}
if (a>0 && b<0 && c>0)
    {cout<<"ikta musbat son \n"<< endl;}
if (a>0 && b>0 && c<0)
    {cout<<"ikta musbat son \n"<< endl;}
if (a>0 && b<0 && c<0)
    {cout<<"bitta musbat son \n"<< endl;}
if (a<0 && b>0 && c<0)
    {cout<<"bitta musbat son \n"<< endl;}
if (a<0 && b<0 && c>0)
    {cout<<"bitta musbat son \n"<< endl;}
if (a<0 && b<0 && c<0)
    {cout<<"musbat son yo`q \n"<< endl;}

```

Natija:1

```

a=1
b=2
c=5
Uchta musbat son

```

Natija:2

```

a=-9
b=5
c=-2
bitta musbat son

```

### Topshiriqlar:

$$1. \quad y = \begin{cases} zx^2 + 9x^3 + 4x & x > 4 \\ zx + 6^x - 3^t & x \leq 4 \end{cases} \quad \begin{matrix} z \geq 6 \\ z < 6 \end{matrix}$$

$$2. \quad y = \begin{cases} zx^2 + 9x^4 + 4x & x > 1 \\ zx + 6^x - 3^t & x \leq 1 \end{cases} \quad \begin{matrix} z \geq a \\ z < a \end{matrix}$$

$$3. \quad y = \begin{cases} 5x^2 + 12x, & x > 10, \\ 3x^2 - 2x, & 5 \leq x \leq 10, \\ 3\sin^2 x + 4, & x < 5. \end{cases}$$

$$4. \quad y = \begin{cases} 2x^3 + 5x^2, & x > 10, \\ 3x^2 - 2x + 1, & -9 \leq x \leq 10, \\ 3\sin^2 x + 4, & x < -9. \end{cases}$$

$$5. \quad y = \begin{cases} ax^2 + bx^a, & x > 7, \\ 3x^5 - 5x, & 3 \leq x \leq 7, \\ 3\sin^a x + b^a, & x < 3. \end{cases}$$

$$6. \quad y = \begin{cases} 5x^5 + x^4 + x^3 + 1, & x > 6, \\ 3x^2 - 2x + ax, & 2 \leq x \leq 6, \\ 3\sin^2 x + 4, & x < 2. \end{cases}$$

$$7. \quad y = \begin{cases} 2x^3 + 5x^2, & x > 5, \\ 3x^a - 2x, & -2 \leq x \leq 5, \\ 3\sin^2 x + 4, & x < -2. \end{cases}$$

$$8. \quad y = \begin{cases} 5x^5 + 3x^4 + 2x^3 + x + 1, & x > 7, \\ 3x^4 - 2x + bx, & -2 \leq x \leq 7, \\ 3\sin^3 x + 4, & x < -2. \end{cases}$$

$$9. \quad y = \begin{cases} 3x^4 + 2x^2, & x > 6, \\ 3x^2 - 2x, & 3 \leq x \leq 6, \\ 3\sin^2 dx + d, & x < 3. \end{cases}$$

$$10. \quad y = \begin{cases} ax^2 + bx^b, & x > 10, \\ 3x^3 - 5x, & 0 \leq x \leq 10, \\ 3\sin^b x + b^b, & x < 0. \end{cases}$$

$$11. \quad y = \begin{cases} 5x^2 + 12x, & x > 1, \\ 3x^2 - 2x, & -5 \leq x \leq 1, \\ 3\sin^2 x + 4, & x < -5. \end{cases} \quad 12. \quad y = \begin{cases} 3x^2 - 4x + 3, & x > 10, \\ 5x^9 + 12x - 18, & 1 \leq x \leq 10, \\ 3\cos^2 x + 4, & x < 1. \end{cases}$$

$$13. \quad y = \begin{cases} 8x^2 + 12x^3, & x > 8, \\ \sqrt{3x^2 - 2x}, & 1 \leq x \leq 8, \\ \sqrt[5]{3\sin^2 x + 4}, & x < 1. \end{cases} \quad 14. \quad y = \begin{cases} 2x^4 + 2x^5, & x > 8, \\ \sqrt{3x^3 - 2x + 2a}, & 1 \leq x \leq 8, \\ \sqrt[5]{3\sin^2 x + 4 - 5b}, & x < 1. \end{cases}$$

$$15. \quad y = \begin{cases} 2x^5 + 5x^3, & x > 2, \\ 3x^a - 2x, & -4 \leq x \leq 2, \\ 3\sin^4 x + 4, & x < -4. \end{cases} \quad 16. \quad y = \begin{cases} 5x^5 + x^4, & x > 6, \\ 3x^2 - 2x + zx, & 2 \leq x \leq 6, \\ 3\sin^2 x + \cos^2 x, & x < 2. \end{cases}$$

$$17. \quad y = \begin{cases} 3x^4 - 4x, & x > 10, \\ 5x^3 + 12x, & 1 \leq x \leq 10, \\ 3\cos^4 x + 4, & x < 1. \end{cases} \quad 18. \quad y = \begin{cases} 3x^5 + x^4 + x^3 + x + 1, & x > 1, \\ 5x^2 - 2x + qx, & -2 \leq x \leq 1, \\ 5\sin^2 x + x + 4, & x < -2. \end{cases}$$

19. butun son berilgan agar berilgan son musbat bo'lsa 1 ga oshirilsin aks xolda o'zgartirilmasin

20. butun son berilgan agar berilgan son musbat bo'lsa 1 ga oshirilsin aks xolda 2 ga kamaytirilsin

21. butun son berilgan agar berilgan son musbat bo'lsa 1 ga oshirilsin manfiy bo'lsa 1 ga kamaytirilsin 0 ga teng bo'lsa 10 ga tenglansin

22. uchta butun son berilgan shu sonlar orasidan nechitasi musbat ekanini aniqlovchi.

23. uchta butun son berilgan shu sonlar orasidan nechitasi musbat, nechitasi manfiy ekanini aniqlovchi.

24. A va B sonlar berilgan shu sonlarni shunday alamashtiringki kattasi A kichigi B ga teng bo'lib qolsin natijada birinchi ekranga kichigini ikkinchi kattasini chiqaruvchi dastur.

25. A va B butun sonlar berilgan agar bu sonlar teng bo'lsa ularning yig'indisini xisoblasin A kata bo'lsa B ni chiqarsin aks xolda A ni chiqarsin, ikkalasi xam 0 ga teng bo'lsa 10 ni chiqarsin.

26. A va B butun sonlar berilgan agar ular bir biriga teng bo'lmasa ikkalasi ham A ga teng bo'lib qolsin agar teng bo'lsa 0 ga teng bo'lib qosin

27. uchta butun son berilgan shu sonlarni kichigini aniqlovchi dastur.

28. uchta  $A, B, C$  butun son berilgan agar  $A=B+C$  bo'lsa B va C birga orttirilsin,  $A<B+C$  bo'lsa A 100 ga orttirilsin  $A>B+C$  bo'lsa A 100 ga kamaytirilsin.

29. 20 ta savoldan iborat xa yo'q o'ynini yarating. Bunda xa 1 ga teng yo'q 0 ga teng bo'lsin.

30. Insonni psixologik xolatini aniqlovchi 10 ta savoldan iborat xa yo'q dasturini tuzing Bunda xa 1 ga teng yo'q 0 ga teng bo'lsin.