**3.3. MUTAXASSISLIK MASALALARINI DASTURLASHDA TARMOQLANUVCHI ALGORITMDAN FOYDALANISH**

Ba’zi hollarda mutaxassislik masalalarida hisoblashlar birorta mantiqiy shartni bajarilishiga bog‘lik holda u yoki bu tarmoq bo‘yicha amalga oshirilishi mumkin. Bunday tuzilishdagi hisoblash jarayonining algoritmi “tarmoqlanuvchi algoritm” deb ataladi.

Tarmoqlanuvchi algoritmlarni dasturlashda tanlash operatorlari, ya’ni *goto* shartsiz o`tish operatori, *if* shartli o`tish operatori va *switch* tanlash operatorlari ishlatiladi**.**

**3.3.1. Tanlash operatorlari**

**Shartli operator**. Shartli operator ikki ko`rinishda ishlatilishi mumkin:

if (ifoda) 1- operator else 2- operator

yoki

if (ifoda) 1-operator

Bu operatorlarni grafik ko`rinishda quyidagicha tasvirlash mumkin.

a

P1

yo’q

ha

a

P1

yo’q

hа

P2

Shartli operator bajarilganda avval ifoda hisoblanadi; agar qiymat rost ya’ni noldan farqli bo`lsa 1- operator bajariladi. Agar qiymat yolg`on ya’ni nol bo`lsa va *else* ishlatilsa 2-operator bajariladi. *Else* qism har doim eng yaqin *if* ga mos qo`yiladi.

if( n>0) if(a>b) z=a; else z=b;

Agar *else* qismni yuqori *if* ga mos quyish lozim bo`lsa, figurali qavslar ishlatish lozim.

if( n>0) { if(a>b) z=a; } else z=b;

Misol sifatida uchta berilgan sonning eng kattasini aniqlash dasturini ko`ramiz:

#include <iostream.h>

void( )

{

float a,b,c,max);

Cout <<“\n a=”; Cin>>a;

Cout <<“\n b=”; Cin>>b;

Cout <<“\n c=”; Cin>>c;

if (a>b)

if (a>c) max=a else max=c;

else

if b>c then max=b else max=c;

Cout <<“\n” <<max;

}

Keyingi misolda kiritilgan ball va maksimal ball asosida baho aniqlanadi:

#include <iostream.h>

void main( )

{

a

P1

yo’q

ha

float ball,max\_ball,baho;

Cout<< “\n ball=”; Cin>>(“%f”,&ball);

Cout<<“\n max\_ball=”; Cin>>max\_ball;

d=ball/max\_ball;

if (d>0.85) baho=5 else

if (d>75) baho=4 else

if (d>0.55) then baho=3 else baho=2;

Cout<<“\n baho;

}

Kalit bo`yicha tanlash operatori. Kalit bo`yicha o`tish *switch* operatori umumiy ko`rinishi qo`yidagicha

Switch(<ifoda>)

{

Case <1-qiymat>:<1-operator>

…

break;

…

default: <operator>

…

case: <n-operator>;

}

Oldin qavs ichidagi butun ifoda hisoblanadi va uning qiymati hamma variantlar bilan solishtiriladi. Biror variantga qiymat mos kelsa shu variantda ko`rsatilgan operator bajariladi. Agar biror variant mos kelmasa *default* orqali ko`rsatilgan operator bajariladi. *Break* operatori ishlatilmasa shartga mos kelgan variantdan tashqari keyingi variantdagi operatorlar ham avtomatik bajariladi. *Default*; *break* va belgilangan variantlar ixtiyoriy tartibda kelishi mumkin. *Default* yoki *break* operatorlarini ishlatish shart emas. Belgilangan operatorlar bo`sh bo`lishi ham mumkin. Misol tariqasida bahoni son miqdoriga qarab aniqlash dasturini ko`ramiz.

Include <iostream.h>

Int baho;

Cin>> baho;

Switch(baho)

{

case 2:Cout <<“\n yomon”;break;

case 3:Cout <<“\n o`rta”;break;

case 4:Cout <<“\n yaxshi”;break;

case 5:Cout <<“\n a’lo”;break;

default: Cout <<“\n baho noto`g`ri kiritilgan”;

};

}

Keyingi misolimizda kiritilgan simvol unli harf ekanligi aniqlanadi:

Include <iostream.h>

Int baho; Char c; Cin >> c;

Switch(c)

{

case ‘a’:

case ‘u’:

case ‘o`:

case ‘i’:

Cout <<“\n Kiritilgan simvol unli harf”;break;

default: Cout <<“\n Kiritilgan simvol unli harf emas”;

};

}

**Tanlash operatoriga misol**

**1-misol:** Kiritilgan raqam ko`rinishidagi bahоni so`z ko`rinishida ifidalash dasturi.

*# include <iostream>*

*using namespace std;*

*int main()*

*{*

*int baho;*

*cin>> baho;*

*switch(baho)*

*{*

*case 2:cout <<"\n yomon";break;*

*case 3:cout <<"\n o`rta";break;*

*case 4:cout <<"\n yahshi";break;*

*case 5:cout <<"\n a'lo";break;*

*default: cout <<"\n baho noto`g`ri kiritilgan";*

*} }*

**2-Misol.** Berilgan N (1≤N≤7) butun songa mos hafta kunini chiqaring.  
**Yechim.** Bu masalani yechish uchun tanlash operatoridan foydalanish kerak bo’ladi:

|  |  |
| --- | --- |
| **#include <iostream>**  **using namescape std;**  **int main () {**  **int n;**  **cout << “N=”; cin >> n;**  **Switch (n){**  **Case 1: cout<< “Dushanba”; break;**  **Case 2: cout<< “Seshanba”; break;**  **Case 3: cout<< “Chorshanba”; break;**  **Case 4: cout<< “Payshanba”; break;**  **Case 5: cout<< “Juma”; break;**  **Case 6: cout<< “Shanba”; break;**  **Case 7: cout<< “Yakshanba”; break;**  **Default: cout << “Adashdingiz!” ;**  **}**  **Return ;**  **}**  har bir **case** ga mos ko’rsatmalar ketma-ketligi oxirida yozilgan **break** operatori shu ko’rsatmalar ketma-ketligi bajarilgandan song tanlash operatoridan chiqishni ta’minlaydi. | **#include <iostream>**  **Using namescape std;**  **Int main () {**  **Int n;**  **Cout << “N=”; cin >> n;**  **Switch (n){**  **Case 1: cout<< “Dushanba”; break;**  **Case 2: cout<< “Seshanba”; break;**  **Case 3: cout<< “Chorshanba”; break;**  **Case 4: cout<< “Payshanba”; break;**  **Case 5: cout<< “Juma”; break;**  **Case 6: cout<< “Shanba”; break;**  **Case 7: cout<< “Yakshanba”; break;**  **Default: cout << “Adashdingiz!” <<endl ;**  **}**  **Cout <<”Xato bo’ldi!” <<end1;**  **Return ;**  **}**  Agar Break operatori yozilmasa, quyidagi xatolar bo’ladi:  N=5  Juma  Shanba  Yakshanba  Adashdingiz!  Xato bo’ldi! |

**3-misol.** Berilgan koordinatalar tekisligi choragi nomeri bo`yicha unda yotuvchi nuqta koordinatalari qiymatlari ishorasini aniqlash dasturini tuzing.

*Dastur kodi:*

***# include <iostream>***

***using namespace std;***

***int main()***

***{ float chorak;***

***cout<< “chorak=”; cin>>chorak;***

***switch(chorak)***

***{***

***case 1: cout<<”\n koordinatalar qiymatlari: x>0,y>0”);break;***

***case 2: cout<<”\n koordinatalar qiymatlari: x<0,y>0’);break;***

***case 3: cout<<”\n koordinatalar qiymatlari: x<0,y<0’);break;***

***case 4: cout<<”\n koordinatalar qiymatlari: x>0,y<0’); break;***

***default: cout <<"\n chorak noto`g`ri kiritilgan";***

*}*

*}*

**Masala.** Elektr zanjiridagi tok manbai klemmalaridagi kuchlanish U=100v bo`lib, qarshiliklari R1=5A va R2=4A bo`lgan iste’molchilar ketma-ket va parallel ulangan holda tok kuchlari qanday bo`lishini aniqlash dasturini tuzing.

I=U/R, R=R1\*R2/(R1+R2), R=R1+R2

Bu masalani yechish uchun tarmoqlanuvchi algoritm yordamida dasturini tuzing.

**Masala dasturi:**

***# include <iostream>***

***# include <string>***

***using namespace std;***

***int main()***

***{***

***float R1, R2, R, I, U;***

***string s;***

***cout<<"Tok manbai klemmalaridagi kuchlanishni kiriting:"<<endl; cin>>U;***

***cout<<"Birinchi istemolchi qarshiligini kiriting:"<<endl; cin>>R1;***

***cout<<"Ikkinchi istemolchi qarshiligini kiriting:"<<endl; cin>>R2;***

***cout<<"Istemolchilar ulanish turini kiriting:"<<endl; cin>>s;***

***if(s=="parallel") R=R1\*R2/(R1+R2);***

***if(s=="ketmaket") R=R1+R2;***

***I=U/R;***

***cout<<"Istemolchilar "<<s<<" ulanganda "<<"tok kuchi=“ <<I<<endl; return 0;}*** (Javob: Istemolchilar Parallel ulanganda tok kuchi= I)

**4-Misol.** Quyidagi misolni yechish dasturini qaraymiz:



x va q - berilgan son.

Dastur kodi:

***#include <iostream>***

***#include <math.h>***

***using namespace std;***

***int main()***

***{***

***float a,q,x,y;***

***a=5.41; b=3;***

***cout<<"x ning qiymatini kiriting"; cin>>x;***

***if (x<q) y=pow(sin(a\*x\*x),3)/sqrt(x\*x+1);***

***else y=(cos(a\*x)+exp(-a\*pow(x,3)))/(pow(x,2./3) +atan(x));***

***cout<<"y="<<y; return 0;***

***}***

**5-Misol:** funksiya qiymatini hisoblashga C++ tilida dastur tuzing.

**Dastur matni:**

**#include <iostream>**

**#include<iomanip>**

**#include <math.h>**

**using namespace std;**

**int main()**

**{**

**float a,b,x,c,z;**

**cin>>a>>b>>c;**

**x=(a\*a-c\*c)/(c\*c-b);**

**if(x>=0)**

**z=(a\*a+b\*b)/c+sqrt(a\*a+x);**

**else**

**z=(sin(x)+b)/(a-b);**

**cout << fixed<<setprecision(3)<<z;**

**return 0;**

**}**

**Ichma-ich joylashtirilgan operatorlardan foydalanish, ya’ni shartlar ikkitadan ko’p bo’lsa:**

|  |  |
| --- | --- |
| Berilgan **x va y** sonlaridan quydagi **z** funksiya qiymatini hisoblang.  Ko’rinib turubdiki, aks holda xolatiga mos keluvchi shart **x>y** ko’rinishida yoziladi. | Dastur kodi:  **#include <iostream>**  **#include <cmath.h>**  **Using namespace std;**  **Int main (){**  **Float x, y, z;**  **Cout << “x= “ ; cin >> x;**  **Cout << “y= “ cin >> y;**  **Z = (x<y) ? pow(y – x,0.5):**  **(x==y) ? x + y : pow(x - y,0.5);**  **Cout << “z= “ << z;**  **Return 0 ;**  **}** |

**Tayanch so’z va iboralar**

Tarmoqlanuvchi algoritm, tanlash operatori, shartli o’tish operatori, shartsiz o’tish operatori, sikl, *Switch* operatori, if operatori, romb.

**Mavzuga oid savol va topshiriqlar**

1. Tarmoqlanuvchi algoritm deb nimaga aytiladi?
2. Mantiqiy “teng emas” qanday belgi bilan ifodalanadi? (!= )
3. C++ tilida “< “ belgi nimani anglatadi ?
4. Blok – sxemadagi romb belgisi nimani anglatadi?
5. *Switch* operatori qachon ishlatiladi?
6. *if* operatori qachon ishlatiladi?
7. Shartsiz o’tish operatori qanday ifodalanadi?
8. Tarmoqlanuvchi algoritm chiziqli algoritmdan nima bilan farqlanadi?