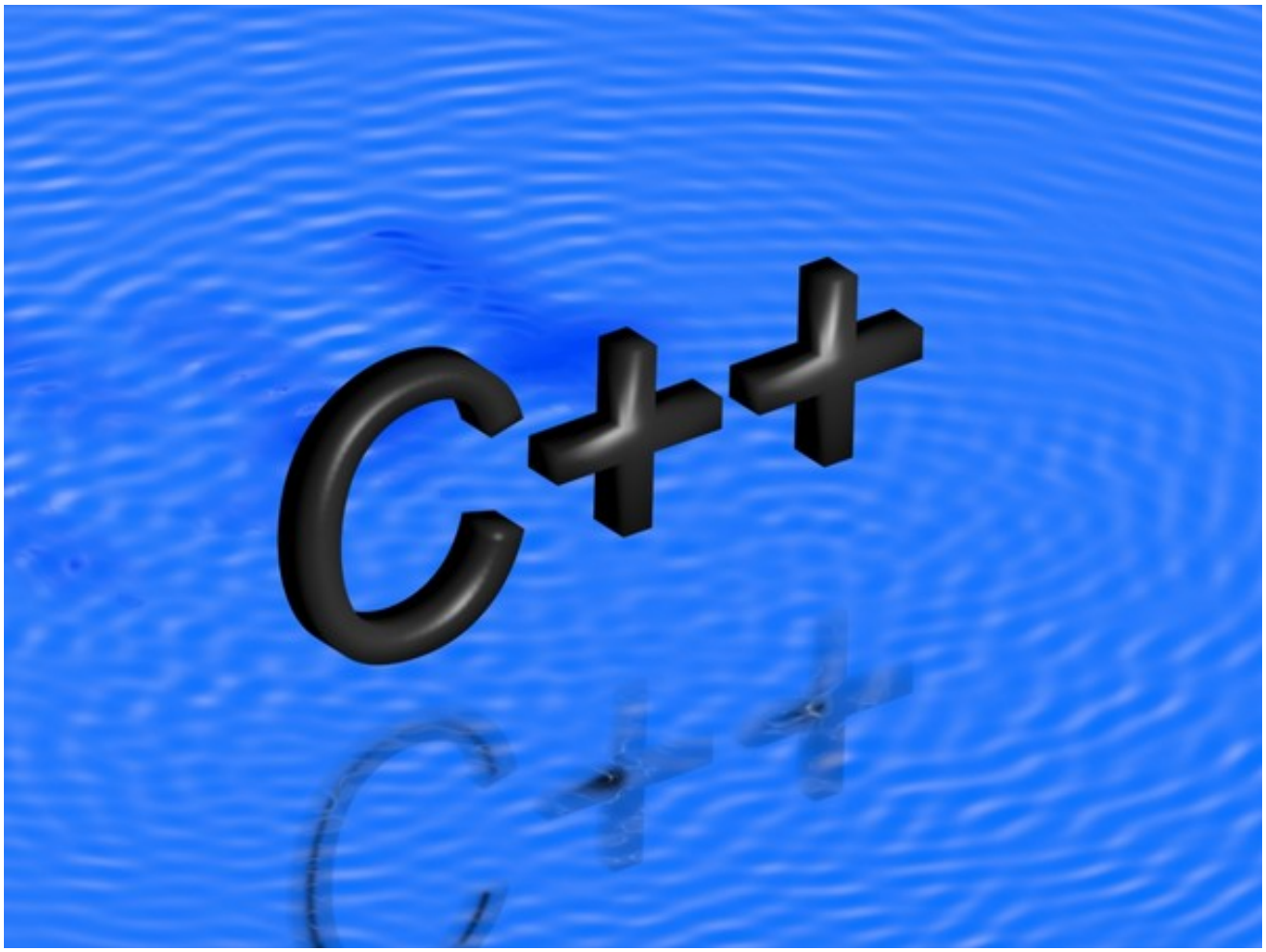
برنامه‌های نمونه درس برنامه نویسی پیشرفته



هومن سیاری

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- کلیه برنامه‌های این مجموعه توسط اینجانب تست شده و اجرا گردیده است و هیچگونه ایرادی ندارند.
- پاسخ برنامه‌ها عینا در پایین همان برنامه آورده شده است.

فصل اول: آشنایی با برنامه‌نویسی

```
// S01-01.cpp :
// Welcome to C++

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
	cout<<"Welcome to C++";
	cout<<endl;
	system("pause");
	return 0;
}
```

```
Welcome to C++
Press any key to continue . . .
```

```
// S01-02.cpp :
// انتخاب عدد بزرگتر بین دو عدد

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
	int x,y,m;
	cout<<"Enter one number : ";
	cin>>x;
	cout<<"Enter one number : ";
	cin>>y;
	if(x>y)
	 m=x;
	else
	 m=y;
	cout<<"maximum is : "<< m;
	cout<<endl;
	system("pause");
	return 0;
}
```

```
Enter one number : 2
Enter one number : 6
Maximum is : 6
Press any key to continue . . .
```

```cpp
// P01-01.cpp :
// چاپ نام و نام خانوادگی

#include "stdafx.h"
#include "iostream"

using namespace std;

int main(void)
{
	cout<<"Hooman Sayyari";
	cout<<endl;
	system("pause");
	return 0;
}
```

```
Hooman Sayyari
Press any key to continue . . .
```

```
// P01-02.cpp :
// چاپ شکل

#include "stdafx.h"
#include<iostream>

using namespace std;

int main(void)
{
	cout<<"  *\n ***\n*****\n ***\n  *";
	cout<<"\n";
	system("pause");
	return 0;
}
```

```
  *
 ***
*****
 ***
  *
Press any key to continue . . .
```

فصل دوم: اصول برنامه‌نویسی

```
// S02-01.cpp :
// Size of Data types

#include "stdafx.h"
#include "iostream"

using namespace std;

int main(void)
{
cout<<"numbers of bytes for data type"<<endl;
cout<<"char:" <<sizeof(char) <<endl ;
cout<<"unsigned char:"<<sizeof(unsigned char) <<endl ;
cout<<"signed char:"<<sizeof(signed char) <<endl ;
cout<<"int:" <<sizeof(int) <<endl;
cout<<"unsigned int:"<<sizeof(unsigned int) <<endl;
cout<<"signed int:" <<sizeof(signed int) <<endl;
cout<< "short int:" <<sizeof(short int) <<endl;
cout<< "unsigned short int:"<<sizeof(unsigned short int) <<endl;
cout<< "signed short int:" <<sizeof(signed short int) <<endl;
cout<<"long int:" <<sizeof(long int) <<endl;
cout<<"unsigned long int:" <<sizeof(unsigned long int) <<endl;
cout<<"signed long int:" <<sizeof(signed long int) <<endl;
cout<<"float:" <<sizeof(float) <<endl;
cout<<"long float:" <<sizeof(long float) <<endl;
cout<<"double:" <<sizeof(double) <<endl;
cout<<"long double:" <<sizeof(long double) <<endl;
cout<<"signed double:" <<sizeof(signed double) <<endl;
cout<<"unsigned double:" <<sizeof(unsigned double) <<endl;
system("pause");
return 0;
}
```

```
numbers of bytes for data type
char:1
unsigned char:1
signed char:1
int:4
unsigned int:4
signed int:4
short int:2
unsigned short int:2
signed short int:2
long int:4
unsigned long int:4
signed long int:4
float:4
long float:8
double:8
long double:8
signed double:4
unsigned double:4
Press any key to continue . . .
```

```cpp
// S02-02.cpp :
// جمع دو عدد

#include "stdafx.h"
#include "iostream"

using namespace std;

int main(void)
{
 int num1,num2,sum=0;
 cout<<"Enter first number : ";
 cin>>num1;
 cout<<"Enter second number : ";
 cin>>num2;
 sum=num1+num2;
 cout<<"Sum of two number is : "<<sum<<endl;
 system("pause");
 return 0;
}
```

```
Enter first number : 5
Enter second number : 6
Sum of two number is : 11
Press any key to continue . . .
```

```
// S02-03.cpp :
// اشاره گر

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 float f,*fp;
 f=10;
 fp=&f;
 cout<<" f = "<<f<<"\n";
 cout<<"*fp = "<<(*fp)<<endl;
 system("pause");
 return 0;
}
```

```
f = 10
*fp = 10
Press any key to continue . . .
```

```
// S02-04.cpp :
// محاسبه محیط و مساحت دایره

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
const double PI=3.14 ;
double radius,area,perime ;
cout<<"Enter the radius : " ;
cin>>radius ;
area=PI*radius*radius ;
cout<<"Area is : "<<area<<"\n";
perime=2*PI*radius ;
cout<<"Perime is : "<<perime<<"\n" ;
system("pause");
return 0;
}
```

```
Enter the radius : 3
Area is : 28.26
Perime is : 18.84
Press any key to continue . . .
```

```
// S02-05.cpp :
// بزرگترین و کوچکترین عدد صحیح و بزرگترین عدد بدون علامت

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
cout<<"Range of types int & unsigned int";
cout<<endl;
cout<<"Type       Minimum        Maximum";
cout<<endl;
cout<<"int        "<<INT_MIN<<"       "<<INT_MAX ;
cout<<endl;
cout<<"unsigned int"<<"  0      ";
cout<<UINT_MAX <<endl;
system("pause");
return 0;
}
```

```
Range of types int & unsigned int
Type     Minimum      Maximum
int      -2147483648     2147483647
unsigned int  0     4294967295
Press any key to continue . . .
```

```
// S02-06.cpp :
// تقسیم

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 int a,b;
 float c;
 cout<<"Enter numerator : ";
 cin>>a ;
 cout<<"Enter denominator : ";
 cin>>b ;
 if(b!=0)
 {
     c=float(a)/float(b);
     cout<<"Result : "<<c;
 }
 else
   cout<<"Cannot divide by zero.";
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter numerator : 12
Enter denominator : 5
Result : 2.4
Press any key to continue . . .
```

```
// S02-07.cpp :
// f=(x+y)*(x-y)

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 float x,y,f;
 cout<<"Enter x : ";
 cin>>x;
 cout<<"Enter y : ";
 cin>>y;
 f=(x+y)*(x-y);
 cout<<"f=(x+y)*(x-y)= ";
 cout<<f<<endl;
 system("pause");
 return 0;
}
```

```
Enter x : 4
Enter y : 3
f=(x+y)*(x-y)= 7
Press any key to continue . . .
```

```
// S02-08.cpp :
// X++ and ++X

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 int var1=0,var2=0;
 cout<<"var1=0,var2=0"<<endl;
 cout<<"var1++="<<var1++<<endl;
 cout<<"++var2="<<++var2<<endl;
 cout<<++var1+var2++<<"\n";
 cout<<var2<<" "<<var1<<"\n";
 system("pause");
 return 0;
}
```

```
var1=0,var2=0
var1++=0
++var2=1
3
2 2
Press any key to continue . . .
```

```cpp
// S02-09.cpp :
// AND & OR

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 bool p,q;
 p=true;
 q=true;
 cout<<p<<" AND "<<q<<" : "<<(p&&q)<<"     ";
 cout<<p<<" OR "<<q<<" : "<<(p||q)<<endl;
 p=true;
 q=false;
 cout<<p<<" AND "<<q<<" : "<<(p&&q)<<"     ";
 cout<<p<<" OR "<<q<<" : "<<(p||q)<<endl;
 p=false;
 q=true;
 cout<<p<<" AND "<<q<<" : "<<(p&&q)<<"     ";
 cout<<p<<" OR "<<q<<" : "<<(p||q)<<endl;
 p=false;
 q=false;
 cout<<p<<" AND "<<q<<" : "<<(p&&q)<<"     ";
 cout<<p<<" OR "<<q<<" : "<<(p||q)<<endl;
 system("pause");
 return 0;
}
```

```
1 AND 1 : 1    1 OR 1 : 1
1 AND 0 : 0    1 OR 0 : 1
0 AND 1 : 0    0 OR 1 : 1
0 AND 0 : 0    0 OR 0 : 0
Press any key to continue . . .
```

```
// S02-10.cpp :
// جدا کردن قسمت صحیح و اعشاری یک عدد

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 int num;
 float f1,f2;
 cout<<"Enter one float number : ";
 cin>>f1;
 num=f1;
 f2=f1-num;
 cout<<"Integer Part : "<<num<<"\n";
 cout<<"Real Part : "<<f2<<"\n";
 system("pause");
 return 0;
}
```

```
Enter one float number : 2.75
Integer Part : 2
Real Part : 0.75
Press any key to continue . . .
```

```cpp
// P02-01.cpp :
// تاثیر انتساب متوالی

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 int a=6,b=7,c=5;
 cout<<a<<"\t"<<b<<"\t"<<c<<"\n";
 a=b=c;
 cout<<"a=b=c"<<endl;
 cout<<a<<"\t"<<b<<"\t"<<c<<"\n";
 system("pause");
 return 0;
}
```

```
6    7    5
a=b=c
5    5    5
Press any key to continue . . .
```

```
// P02-02.cpp :
// محاسبه عبارت

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
    int m,n=66;
    m =(n+5)+9;
    cout<<"m =(n+5)+9"<<endl;
    cout<<"m="<<m<<"\t"<<"n="<<n<<"\n";
    system("pause");
    return 0;
}
```

```
m =(n+5)+9
m=80    n=66
Press any key to continue . . .
```

```
// P02-04.cpp :
// s=(x+y)/(x-y)

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 float x,y,s;
 cout<<"Enter x : ";
 cin>>x;
 cout<<"Enetr y : ";
 cin>>y;
 if((x-y)!=0)
  {
  s=(x+y)/(x-y);
  cout<<"s = "<<s;
  }
 else
 cout<<"Cannot divide by zero.";
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter x : 5
Enetr y : 4
s = 9
Press any key to continue . . .
```

```
// P02-05.cpp :
// دریافت حقوق خالص و مالیات و محاسبه حقوق پرداختی

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
float salary,tax,s;
cout<<"Enter Salary : ";
cin>>salary;
cout<<"Enter percent tax : ";
cin>>tax;
s=salary-tax*salary;
cout<<"\nsalary : ";
cout<<s<<endl;
system("pause");
return 0;
}
```

```
Enter Salary : 500000
Enter percent tax : 0.05

salary : 475000
Press any key to continue . . .
```

فصل سوم: قالب بندی خروجی

```
// S03-01.cpp :
// Welcome to C++

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
  cout<<"welcome to c++";
  cout<<"\n";
  system("pause");
  return 0;
}
```

```
welcome to c++
Press any key to continue . . .
```

```
// S03-02.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
    cout<<"welcome \nto \n\nc++! \n";
    system("pause");
    return 0;
}
```

```
welcome
to

c++!
Press any key to continue . . .
```

```
// S03-03.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
  cout<<"red"<<"\t"<<"blue"<<"\n"<<"yellow";
  cout<<"\n";
  system("pause");
  return 0;
}
```

```
red     blue
yellow
Press any key to continue . . .
```

```
// S03-04.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
cout<<"red\ blue? yellow:"<<"\n";
cout<<"red\\ blue\\ yellow"<<"\n";
cout<<"red\? blue\? yellow"<<"\n";
cout<<"red\: blue\: yellow"<<"\n";
cout<<"red\b blue\b yellow"<<"\n";
cout<<"red\" blue\" yellow"<<"\n";
system("pause");
return 0;
}
```

```
red blue? yellow:
red\ blue\ yellow
red? blue? yellow
red: blue: yellow
re blu yellow
red" blue" yellow
Press any key to continue . . .
```

```
// S03-05.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
cout<<"endl"<<"\n";
cout<<"hello"<<endl;
cout<<"goodmorning";
cout<<"\n";
system("pause");
return 0;
}
```

```
endl
hello
Goodmorning
Press any key to continue . . .
```

```
// S03-06.cpp :
// دریـافت 2 عدد و جمع آنـها

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num1,num2,sum;
cout<<"Enter one number : ";
cin>>num1 ;
cout<<"Enter one number : ";
cin>>num2;
sum=num1+num2;
cout<<"Sum is : ";
cout<<sum;
cout<<"\n";
system("pause");
return 0;
}
```

```
Enter one number : 5
Enter one number : 8
Sum is : 13
Press any key to continue . . .
```

```
// S03-07.cpp :
// مساحت مربع

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
float x,area;
cout<<"Enter a Side : ";
cin>>x;
area=x*x;
cout<<"Area is : " <<area;
cout<<"\n";
system("pause");
return 0;
}
```

```
Enter a Side : 5
Area is : 25
Press any key to continue . . .
```

```
// S03-08.cpp :
// جمع 3 عدد

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num1,num2,num3,sum;
cout<<"Enter one number : ";
cin>>num1 ;
cout<<"Enter one number : ";
cin>>num2;
cout<<"Enter one number : ";
cin>>num3;
cout<<"Sum is : ";
sum=num1+num2+num3;
cout<<sum<<"\n";
system("pause");
return 0;
}
```

```
Enter one number : 5
Enter one number : 6
Enter one number : 7
Sum is : 18
Press any key to continue . . .
```

```
// S03-09.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.setf(ios::showpoint);
 cout.setf(ios::showpos);
 cout<<100.0;
 cout<<"\n";
 system("pause");
 return 0;
}
```

```
+100.000
Press any key to continue . . .
```

```
// S03-10.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.unsetf(ios::dec);
 cout.setf(ios::hex|ios::scientific);
 cout<<123.23<<" hello "<<100<<"\n";
 cout.setf(ios::showpos);
 cout<<10<<" "<<-10<<"\n";
 cout.setf(ios::showpoint|ios::fixed);
 cout<<100.0;
 cout<<"\n";
 system("pause");
 return 0;
}
```

```
1.232300e+002 hello 64
a fffffff6
+100.000
Press any key to continue . . .
```

```
// S03-11.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.setf(ios::uppercase|ios::scientific);
 cout<<1001.12;
 cout.unsetf(ios::uppercase);
 cout<<"\n"<<1100.12;
 cout<<"\n";
 system("pause");
 return 0;
}
```

```
1.001120E+003
1.100120e+003
Press any key to continue . . .
```

```
// S03-12.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.precision(4);
 cout.width(10);
 cout<<10.12345<<"\n";
 cout.fill('*');
 cout.width(10);
 cout<<10.12345<<"\n";
 cout.width(10);
 cout<<"Hi!"<<"\n";
 cout.width(10);
 cout.setf(ios::left);
 cout<<10.12345;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
     10.12
*****10.12
*******Hi!
10.12*****
Press any key to continue . . .
```

```
// S03-13.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 bool b;
 cout<<"Before setting boolalpha flag: ";
 b=true;
 cout<<b<<" ";
 b=false;
 cout<<b<<endl;
 cout<<"After setting boolalpha flag: ";
 b=true;
 cout<<boolalpha<<b<<" ";
 b=false;
 cout<<b<<endl;
 cout<<"Enter a Boolean value: ";
 cin>>boolalpha>>b;
 cout<<"You entered "<<b<<endl;
 system("pause");
 return 0;
}
```

```
Before setting boolalpha flag: 1 0
After setting boolalpha flag: true false
Enter a Boolean value: true
You entered true
Press any key to continue . . .
```

```
// P03-01.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.setf(ios::hex,ios::basefield);
 cout<<12300<<"\n";
 cout.fill('?');
 cout.width(10);
 cout<<232343.0;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
300c
????232343
Press any key to continue . . .
```

```
// P03-02.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
cout.setf(ios::showpoint);
cout.setf(ios::showpos);
cout<<102340.0;
cout<<endl;
system("pause");
return 0;
}
```

```
+102340.
Press any key to continue . . .
```

```
// P03-03.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.setf(ios::uppercase | ios::scientific);
 cout<<1010.112;
 cout.unsetf(ios::uppercase);
 cout<<endl<<1100.112;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
1.010112E+003
1.100112e+003
Press any key to continue . . .
```

```
// P03-04.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
cout.setf(ios::showpos);
cout.setf(ios::scientific);
cout<<123<<" "<< 123.23;
cout<<endl;
system("pause");
return 0;
}
```

```
+123 +1.232300e+002
Press any key to continue . . .
```

```
// P03-05.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.setf(ios::showpos);
 cout.setf(ios::showbase);
 cout<<123<<" "<<hex<<123;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
+123 0x7b
Press any key to continue . . .
```

```
// P03-06.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.precision(2);
 cout<<1000.243<<endl;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
1e+003
Press any key to continue . . .
```

```
// P03-07.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout.precision(4);
 cout<<10.0/3.0<<'\n';
 system("pause");
 return 0;
}
```

```
3.333
Press any key to continue . . .
```

```
// P03-08.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout<<100<<" ";
 cout.unsetf(ios::dec);
 cout.setf(ios::hex);
 cout<<100<<" ";
 cout.unsetf(ios::hex);
 cout.setf(ios::oct);
 cout<<100<<"\n";
 system("pause");
 return 0;
}
```

```
100  64  144
Press any key to continue . . .
```

```
// P03-09.cpp :
// Formatting

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 cout<<(10>20?10:20);
 cout<<" "<<(99>88 ? 99 : 88);
 cout<<endl;
 system("pause");
 return 0;
}
```

```
20 99
Press any key to continue . . .
```

فصل چهارم: ساختارهای کنترلی

```
// S04-01.cpp
// عبارات شرطی

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 bool b1,b2,b3;
 int x=3,y=4,z=6,w=6;
 b1=((x<y)&&(z==w));
 b2=((x>y)||(z==w));
 b3=((x>y)||(z!=w));
 cout<<"x=3, y=4, z=6, w=6"<<endl;
 cout<<"(x<y)&&(z==w)--> "<<b1<<endl;
 cout<<"(x>y)||(z==w)--> "<<b2<<endl;
 cout<<"(x>y)||(z!=w)--> "<<b3<<endl;
 system("pause");
 return 0;
}
```

```
x=3, y=4, z=6, w=6
(x<y)&&(z==w)--> 1
(x>y) || (z==w)--> 1
(x>y) || (z!=w)--> 0
Press any key to continue . . .
```

```
// S04-02.cpp
// چاپ حروفی فقط عدد 20

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 int num;
 cout<<"Enter a Number : ";
 cin>>num ;
 if(num==20)
   cout<<"Twenty";
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter a Number : 20
Twenty
Press any key to continue . . .
```

```
// S04-03.cpp
// تعیین عدد فرد و زوج

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 int num;
 cout<<"Enter a number : ";
 cin>>num;
 if(num%2==0)
   cout<<"The number is even."<< endl;
 else
   cout<<"The number is odd."<<endl;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter a number : 18
The number is even.
Press any key to continue . . .
```

```
// S04-04.cpp
// تعیین عدد بزرگتر میان دو عدد

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num1,num2,max;
cout<<"Enter one number : ";
cin>>num1;
cout<<"Enter one number : ";
cin>>num2 ;
if(num1>num2)
 max=num1;
else
 max=num2;
cout<<"Max of two numbers is : ";
cout<<max<<endl;
system("pause");
return 0;
}
```

```
Enter one number : 23
Enter one number : 45
Max of two numbers is : 45
Press any key to continue . . .
```

```
// S04-05.cpp
// تعیین عدد بزرگتر میان دو عدد

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num1,num2,max;
cout<<"Enter one number : ";
cin>>num1 ;
cout<<"Enter one number : ";
cin>>num2;
num1>num2 ? max=num1 : max=num2;
cout<<"Max of two numbers is : ";
cout<<max;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter one number : 23
Enter one number : 45
Max of two numbers is : 45
Press any key to continue . . .
```

گروه	حدود نمره
A	>=90
B	<90 and >=80
C	<80 and >=70
D	<70 and >=60
E	<60

```
// S04-06.cpp
//تعیین گروه نمره

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int testScore;
cout<<"Enter your test score : ";
cin>>testScore;
if(testScore>=90)
 cout<<"Your grade is an A"<< endl;
else
 if(testScore>=80)
  cout<<"Your grade is a B"<<endl;
 else
  if(testScore>=70)
   cout<<"Your grade is a C"<<endl;
  else
   if(testScore>=60)
     cout<<"Your grade is a D"<<endl;
   else
     cout<<"Your grade is an E"<<endl;
system("pause");
return 0;
}
```

```
Enter your test score : 57
Your grade is an F
Press any key to continue . . .
```

```
// S04-07.cpp
// تعریف متغیر در یک بلاک(دستور کنترلی، حلقه، شرط و ...)

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int x=5;
cout<<x<<"\t";
if(x>0)
 {
  int x=6;
  cout<<x<<"\t";
 }
cout<<x;
cout<<endl;
system("pause");
return 0;
}
```

```
5    6    5
Press any key to continue . . .
```

```
// S04-08.cpp
// ورود 2 عدد و یک عملگر و انجام محاسبه

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
float num1,num2;
char op;
cout<<"Enter first Operand : ";
cin>>num1;
cout<<"Enter second Operand : ";
cin>>num2;
cout<<"Enter Operator : ";
cin>>op;
switch(op)
 {
 case '+':
  cout<<"Sum is : "<<(num1+num2);
  break ;
 case '-':
  cout<<"Minus is : "<<(num1-num2);
  break;
 case '/':
  cout<<"Division is : "<<(num1/num2);
  break ;
 case '*':
  cout<<"Multiply is  : "<<(num1*num2);
  break ;
 default:
  cout<<"Operator is illegal.";
 }
cout<<endl;
system("pause");
return 0;
}
```

```
Enter first Operand : 5
Enter second Operand : 8
Enter Operator : *
Multiply is  : 40
Press any key to continue . . .
```

```
// S04-09.cpp
// S04-06.cpp برعکس

#include "stdafx.h"
#include<iostream>
#include<conio.h>

using namespace std;

int main(void)
{
char grade;
 cout<<"Enter your grade : ";
 cin>>grade;
 switch(grade)
 {
 case 'a':
 case 'A':
  cout <<"Your average must be between 90-100";
  break;
 case 'b':
 case 'B':
  cout<<"Your average must be between 80-89";
  break;
 case 'c':
 case 'C':
  cout<<"Your average must be between 70-79";
  break;
 case 'd':
 case 'D':
  cout<<"Your average must be between 60-69";
  break;
 default:
  cout<<"Your average must be below 60";
 }
cout<<endl;
system("pause");
return 0;
}
```

```
Enter your grade : b
Your average must be between 80-89
Press any key to continue . . .
```

```
// S04-10.cpp
// میانگین 10 عدد

#include "stdafx.h"
#include<iostream>

using namespace std;

int main(void)
{
int i;
float sum=0,ave,num;
for(i=1;i<=10;i++)
{
  cout<<"Enter number "<<i<< " : ";
  cin>>num;
  sum+=num;
 }
ave=sum/10;
cout<<"The Average is : "<< ave;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter number 1 : 2
Enter number 2 : 3
Enter number 3 : 5
Enter number 4 : 7
Enter number 5 : 9
Enter number 6 : 10
Enter number 7 : 25
Enter number 8 : 13
Enter number 9 : 18
Enter number 10 : 37
The Average is : 12.9
Press any key to continue . . .
```

```
// S04-11.cpp
// 20 تا 10 بین زوج اعداد مجموع

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int i,sum=0;
for(i=10;i<=20;i+=2)
 sum=sum+i;
cout<<"Sum of EVEN from 10 to 20 is : "<<sum;
cout<<endl;
system("pause");
return 0;
}
```

```
Sum of EVEN from 10 to 20 is : 90
Press any key to continue . . .
```

```
// S04-12.cpp
// فاکتوریل

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int fact=1,i,n;
cout<<"Enter one number : ";
cin>>n;
for(i=1;i<=n;i++)
  fact*=i;
cout<<"factorial is :"<<fact;
 cout<<endl;
system("pause");
return 0;
}
```

```
Enter one number : 5
factorial is :120
Press any key to continue . . .
```

```
// S04-13.cpp
// Xn محاسبه

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int n;
float x,p=1;
cout<<"Enter x : ";
cin>>x;
cout<<"Enter n : ";
cin>>n;
for(int i=1;i<=n;i++)
  p=p*x;
cout<<"Power is : "<<p;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter x : 3
Enter n : 4
Power is : 81
Press any key to continue . . .
```

```
// S04-14.cpp
// چاپ کد اسکی کاراکترهای a تا c

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
char ch;
int code;
for(ch='a';ch<='c';ch++)
{
 code=ch;
 cout<<" ch : "<<ch;
 cout<<"  **  code : "<<code;
 cout<<endl;
}
system("pause");
return 0;
}
```

```
ch : a  **  code : 97
ch : b  **  code : 98
ch : c  **  code : 99
Press any key to continue . . .
```

```
// S04-15.cpp
// بزرگترین عدد میان 10 عدد

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num,max;
cout<<"Enter one number : ";
cin>>num;
max=num;
for(int i=1;i<=9;i++)
 {
 cout<<"Enter one number : ";
 cin>>num;
 if(num>max)
  max=num;
 }
cout<<"Max is : ";
cout<<max;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter one number : 10
Enter one number : 25
Enter one number : 36
Enter one number : 4
Enter one number : 5
Enter one number : 87
Enter one number : 15
Enter one number : 26
Enter one number : 14
Enter one number : 18
Max is : 87
Press any key to continue . . .
```

```
// S04-16.cpp
 // for تاثیر ; در انتهای دستور

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
for(int i=0;i<10;i++);
 cout<<"output";
cout<<endl;
system("pause");
return 0;
}
```

```
Output
Press any key to continue . . .
```

```
// S04-17.cpp
// جدول ضرب

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int i,j;
for(i=1;i<=10;i++)
 {
 for(j=1;j<=10;j++)
  cout<<i*j<<"  ";
 cout<<endl;
 }
system("pause");
return 0;
}
```

```
1  2  3  4  5  6  7  8  9  10
2  4  6  8  10  12  14  16  18  20
3  6  9  12  15  18  21  24  27  30
4  8  12  16  20  24  28  32  36  40
5  10  15  20  25  30  35  40  45  50
6  12  18  24  30  36  42  48  54  60
7  14  21  28  35  42  49  56  63  70
8  16  24  32  40  48  56  64  72  80
9  18  27  36  45  54  63  72  81  90
10  20  30  40  50  60  70  80  90  100
Press any key to continue . . .
```

```
// S04-18.cpp
// S=(1!*2^2)/2! - (2!*2^3)/3! + (3!*2^4)/4! - (-1)n+1(n!*2^n+1)/(n+1)!

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int n,i,k=1;
float f1,f2,p,s=0;
f1=1;
f2=2;
p=4 ;
cout<<"Enter n : ";
cin>>n;
for(i=1;i<=n;i++)
{
 s=s+(f1*p)/f2*k ;
 k=k*(-1);
 f1=f1*(i+1);
 f2=f2*(i+2);
 p=p*2;
}
cout<<"S = "<<s ;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter n : 5
S = 7.6
Press any key to continue . . .
```

```
// S04-19.cpp
// while چاپ اعداد 1 تا 10 با

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num;
num=1;
while(num<=10)
 {
  cout<<num<<" ";
  num++;
 }
cout<<endl;
system("pause");
return 0;
}
```

```
1 2 3 4 5 6 7 8 9 10
Press any key to continue . . .
```

```
// S04-20.cpp
// شمارش حروف کوچک یک جمله منتهی به نقطه

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
char ch;
int count=0;
cout<<"Type a statement and point to end :";
cout<<endl;
cin>>ch;
while(ch!='.')
 {
 if((ch<='z')&&(ch>='a'))
  count++ ;
 cin>>ch;
 }
cout<<"Number of small character is : "<<count;
cout<<endl;
system("pause");
return 0;
}
```

```
Type a statement and point to end :
Hi, This is a Test.
Number of small character is : 10
Press any key to continue . . .
```

```
// S04-21.cpp
 // while چاپ اعداد بین 0 تا 9 با

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int i=0;
while(i<10)
 {
 cout<<"num is : "<<i<<"\n";
 i++;
 }
system("pause");
return 0;
}
```

```
num is : 0
num is : 1
num is : 2
num is : 3
num is : 4
num is : 5
num is : 6
num is : 7
num is : 8
num is : 9
Press any key to continue . . .
```

```
// S04-22.cpp
//(ادغام گام حرکت و شرط حلقه) while با 10 تا 1 بین اعداد چاپ

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num=0;
while(num++<10)
 cout<<num<<" ";
cout<<endl;
system("pause");
return 0;
}
```

```
1 2 3 4 5 6 7 8 9 10
Press any key to continue . . .
```

```
// S04-23.cpp
// جدول ضرب با while

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int i=0;
while(i++<10)
 {
 int j=0;
 while(j++<10)
   cout<<i*j<<"   ";
  cout<<"\n";
  }
system("pause");
return 0;
}
```

```
1  2  3  4  5  6  7  8  9  10
2  4  6  8  10  12  14  16  18  20
3  6  9  12  15  18  21  24  27  30
4  8  12  16  20  24  28  32  36  40
5  10  15  20  25  30  35  40  45  50
6  12  18  24  30  36  42  48  54  60
7  14  21  28  35  42  49  56  63  70
8  16  24  32  40  48  56  64  72  80
9  18  27  36  45  54  63  72  81  90
10  20  30  40  50  60  70  80  90  100
Press any key to continue . . .
```

```
// S04-24.cpp
//  do-while چاپ اعداد بین 1 تا 10 با

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int counter=1;
do
 {
 cout<<counter<<" ";
 counter++;
 }
while(counter<=10);
cout<<endl;
system("pause");
return 0;
}
```

```
1 2 3 4 5 6 7 8 9 10
Press any key to continue . . .
```

```
// S04-25.cpp
// معکوس کردن عدد

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num,digit;
digit=0;
cout<<"Enter a number : ";
cin>>num;
do
 {
 digit=digit*10;
 digit=digit+(num%10);
 num=num/10;
 }
while(num!=0);
cout<<"Inverse is : "<<digit;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter a number : 1357
Inverse is : 7531
Press any key to continue . . .
```

```
// S04-26.cpp
// دریافت ورودی تا رسیدن به کلمه عبور ۱۲۳

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int pw,password=123;
do
 {
 cout<<"Enter password : ";
 cin>>pw;
 }
while(pw!=password);
cout<<"Log on complete\n";
cout<<endl;
system("pause");
return 0;
}
```

```
Enter password : 12
Enter password : 15
Enter password : 123
Log on complete
Press any key to continue . . .
```

```
// S04-27.cpp
// goto

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
cout<<"Line 1 "<<"\n";
goto end;
cout<<"Line 2 "<<"\n";
end: cout<<"End";
cout<<endl;
system("pause");
return 0;
}
```

```
Line 1
End
Press any key to continue . . .
```

```
// S04-28.cpp
// continue چاپ اعداد زوج بین 1 تا 10 با

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int counter=1;
while(counter<=10)
{
 counter++;
 if(counter%2!=0)
  continue;
 cout<<counter<<"\t";
}
cout<<endl;
system("pause");
return 0;
}
```

```
2    4    6    8    10
Press any key to continue . . .
```

```
// S04-29.cpp
// دریافت تعدادی عدد و محاسبه مجموع

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num,sum=0;
char choice;
cout<<"Enter number : ";
cin>>num;
while(1)
 {
 sum+=num;
 cout<<"try again (Y/N): ";
 cin>>choice;
 if(choice=='Y' || choice=='y')
  {
  cout<<"Enter number : ";
  cin>>num;
  }
 else
    break;
 }
cout<<"Sum of numbers is : "<<sum;
  cout<<endl;
system("pause");
return 0;
}
```

```
Enter number : 10
try again (Y/N): y
Enter number : 20
try again (Y/N): y
Enter number : 30
try again (Y/N): n
Sum of numbers is : 60
Press any key to continue . . .
```

```
// P04-01.cpp
// آیا عدد اول بر عدد دوم بخش پذیر هست یا نه؟

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num1,num2;
cout<<"Enter first integer : ";
cin>>num1;
cout<<"Enter second integer : " ;
cin>>num2;
if(num1%num2==0)
 cout<<num1<<" is divisible by "<<num2;
else
 cout<<num1<<" is not divible by "<<num2;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter first integer : 40
Enter second integer : 10
40 is divisible by 10
Press any key to continue . . .
```

```
// P04-02.cpp
//دریافت 2 عدد و چاپ مرتب آنها

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 int num1,num2;
 cout<<"Enter first integer : ";
 cin>>num1;
 cout<<"Enter second integer : ";
 cin>>num2;
 cout<<"Sorted numbers : ";
 if(num1<num2)
  cout<<num1<<"\t"<<num2;
 else
  cout<<num2<<"\t"<<num1;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter first integer : 52
Enter second integer : 18
Sorted numbers : 18    52
Press any key to continue . . .
```

```
// P04-03.cpp
//چاپ بزرگترین عدد میان 3 عدد

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num1,num2,num3,max;
cout<<"Enter first number : ";
cin>>num1;
cout<<"Enter second number : ";
cin>>num2;
cout<<"Enter three number : ";
cin>>num3;
max=num1;
if((num2>max)&&(num2>num3))
  max=num2;
if((num3>max)&&(num3>num2))
  max=num3;
cout<<"Maximum is : "<<max;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter first number : 25
Enter second number : 36
Enter three number : 15
Maximum is : 36
Press any key to continue . . .
```

```
// P04-04.cpp
// حاصل جمع مربعات اعداد 1 تا 10

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int i=0,sum=0;
for(i=1;i<=10;i++)
{
	cout<<i<<"-->"<<i*i<<endl;
	sum=sum+i*i;
}
cout<<"Sum first 10 squares of numbers is : ";
cout<<sum;
cout<<endl;
system("pause");
return 0;
}
```

```
1-->1
2-->4
3-->9
4-->16
5-->25
6-->36
7-->49
8-->64
9-->81
10-->100
Sum first 10 squares of numbers is : 385
Press any key to continue . . .
```

```
// P04-05.cpp
// دریافت 10 عدد و چاپ دو عدد بزرگتر

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int i,max1,max2,n;
cout<<"Enter one number : ";
cin>>n;
max1=n;
cout<<"Enter one number : ";
cin>>n;
if(n>max1)
 {
 max2=max1;
 max1=n;
 }
else
 max2=n;
for(i=0;i<8;i++)
 {
  cout<<"Enter one number : ";
  cin>>n;
  if(n>max1)
  {
   max2=max1;
   max1=n;
   }
  else
    if(n>max2)
      max2=n;
 }
cout<<"Maximum Two Numbers are : ";
cout<<max1<<"\t"<<max2;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter one number : 15
Enter one number : 25
Enter one number : 35
Enter one number : 45
Enter one number : 55
Enter one number : 65
Enter one number : 75
Enter one number : 85
Enter one number : 95
Enter one number : 100
Maximum Two Numbers are : 100   95
Press any key to continue . . .
```

```
// P04-06.cpp
// محاسبه مقدار e با استفاده از فرمول زیر
// e=1+(1/1!)+(1/2!)+(1/3!)+(1/4!)+…+(1/20!)

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
double e=1,f=1;
for(int i=1;i<=20;i++)
 {
 f=f*i;
 e=e+1/f;
 }
cout<<"e = " << e;
cout<<endl;
system("pause");
return 0;
}
```

```
e = 2.71828
Press any key to continue . . .
```

```
// P04-07.cpp
// حاصل ضرب اعداد فرد بین 1 تا 15

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
 long int p=1;
 for(int i=1;i<=15;i=i+2)
   p=p*i;
 cout<<"p="<<p;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
p=2027025
Press any key to continue . . .
```

```
// P04-08.cpp
// دریافت 2 عدد و تعیین عدد بزرگتر و یا تعیین تساوی

#include "stdafx.h"
#include<iostream>
#include<conio.h>

using namespace std;

int main(void)
{
int x,y;
cout<<"enter one number:";
cin>>x;
cout<<"enter one number:";
cin>>y;
if(x>y)
  cout<<x<<" is larger.";
if(x<y)
 cout<<y<<" is larger.";
if(x==y)
  cout<<"These numbers are equal.";
cout<<endl;
system("pause");
return 0;
}
```

```
enter one number:25
enter one number:36
36 is larger.
Press any key to continue . . .
```

```
// P04-09.cpp
// دریافت 3 عدد و محاسبه مجموع، میانگین، حاصل ضرب، کوچکتر و بزرگتر

#include "stdafx.h"
#include <iostream>


using namespace std;

int main(void)
{
float x,y,z,sum,average,product;
float smallest,largest;
cout<<"Input three different number : ";
cin>>x>>y>>z;
sum=x+y+z;
cout<<"\nSum is : "<<sum;
average=sum/3;
cout<<"\nAverage is : "<<average;
product=x*y*z;
cout<<"\nProduct is : "<<product;
smallest=x;
if(y<smallest)
  smallest=y;
if(z<smallest)
  smallest=z;
cout<<"\nSmallest is : "<<smallest;
largest=x;
if(y>largest)
  largest=y;
if (z>largest)
   largest=z;
cout<<"\nLargest is : "<<largest;
cout<<endl;
system("pause");
return 0;
}
```

```
Input three different number : 25 36 12

Sum is : 73
Average is : 24.3333
Product is : 10800
Smallest is : 12
Largest is : 36
Press any key to continue . . .
```

```
// P04-10.cpp
// آیا عدد اول مضربی از عدد دوم هست یا نه؟

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int num1,num2;
cout<<"Enter first number : ";
cin>>num1;
cout<<"Enter second number : ";
cin>>num2;
if(num1%num2==0)
 cout<<"first number is multiple second number";
else
 cout<<"first number isnot multiple second number";
cout<<endl;
system("pause");
return 0;
}
```

```
Enter first number : 25
Enter second number : 5
first number is multiple second number
Press any key to continue . . .
```

```
// P04-11.cpp
// محاسبه مربع و مکعب اعداد بین 0 تا 10

#include "stdafx.h"
#include <iostream>


using namespace std;

int main(void)
{
int i;
cout<<"integer square cube\n";
for(i=0;i<=10;i++)
  cout<<i<<"\t"<<i*i<<"\t"<<i*i*i<<"\n";
system("pause");
return 0;
}
```

```
integer square cube
0       0     0
1       1     1
2       4     8
3       9     27
4       16    64
5       25    125
6       36    216
7       49    343
8       64    512
9       81    729
10      100   1000
Press any key to continue . . .
```

```
// P04-12.cpp
// محاسبه Xn با استفاده از while

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int x,n,i=1,power=1;
cout<<"Enter base as an integer : ";
cin>>x;
cout<<"Enter exponent as an integer : ";
cin>>n;
while(i<=n)
 {
  power*=x;
  i++;
 }
cout<<"Power is : "<<power;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter base as an integer : 2
Enter exponent as an integer : 5
Power is : 32
Press any key to continue . . .
```

فصل پنجم: توابع

```
// S05-01.cpp
// بزرگترین عدد بین 2 عدد با تابع

#include "stdafx.h"
#include <iostream>

using namespace std;

int max(int x,int y);

int main(void)
{
int a,b,m;
cout<<"Enter number1 : ";
cin>>a;
cout<<"Enter number2 : ";
cin>>b;
m=max(a,b);
cout<<"Max of two numbers is : ";
cout<<m;
cout<<endl;
system("pause");
return 0;
}

int max(int x,int y)
{
int m;
if(x>y)
 m=x;
else
 m=y;
return(m);
}
```

```
Enter number1 : 5
Enter number2 : 20
Max of two numbers is : 20
Press any key to continue . . .
```

```
// S05-02.cpp
// جمع 2 عدد با پروسیجر

#include "stdafx.h"
#include <iostream>

using namespace std;

void sum (int x ,int y);

int main(void)
 {
 int a,b;
 cout<<"Enter number1 : ";
 cin>>a;
 cout<<"Enter number2 : ";
 cin>>b;
 sum(a,b);
cout<<endl;
system("pause");
return 0;
 }

void sum(int x,int y)
 {
   int s;
  s=x+y;
  cout<<"Sum of two numbers is : ";
  cout<<s;
}
```

```
Enter number1 : 5
Enter number2 : 20
Sum of two numbers is : 25
Press any key to continue . . .
```

```
// S05-03.cpp
// محاسبه مساحت مستطیل با تابع

#include "stdafx.h"
#include <iostream>

using namespace std;

double rect_area(double length , double width)
{
 double area;
 area=length*width;
 return area;
}

int main(void)
{
 cout<<"10 x 5.8 rectangle has area : ";
 cout<<rect_area(10.0 , 5.8)<<"\n";
 cout<<"10 x 10 rectangle has area : ";
 cout<<rect_area(10.0 , 10.0)<<"\n";
 system("pause");
 return 0;
}
```

```
10 x 5.8 rectangle has area : 58
10 x 10 rectangle has area : 100
Press any key to continue . . .
```

```
// S05-04.cpp
// محاسبه فاکتوریل با تابع

#include "stdafx.h"
#include<iostream>

using namespace std;

long int fact(int n)
 {
 long int f=1;
 int i;
 for (i=1;i<=n;i++)
    f=f*i;
 return f;
 }

int main(void)
 {
 int n;
 long int f2;
 cout<<"Enter your number : ";
 cin>>n ;
 f2=fact(n);
 cout<<"Factorial is : ";
 cout<<f2;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter your number : 5
Factorial is : 120
Press any key to continue . . .
```

```
// S05-05.cpp
// محاسبه Xn با تابع

#include "stdafx.h"
#include <iostream>

using namespace std;

double power(double x,int n)
{
 double p=1;
 int i;
 for(i=1;i<=n;i++)
   p=p*x;
 return p;
}

int main(void)
{
 int n;
 double x,p;
 cout<<"Enter x : ";
 cin>>x;
 cout<<"Enter n : ";
 cin>>n;
 p=power(x,n);
 cout<<"Power is : ";
 cout<<p;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter x : 3
Enter n : 4
Power is : 81
Press any key to continue . . .
```

```
// S05-06.cpp
// متغیرهای محلی و سراسری همنام

#include "stdafx.h"
#include <iostream>

using namespace std;

int x=7;

int main(void)
{
 double x=10.5;
 cout<<"Local double value of number ( x ): ";
 cout<<x<<endl;
 cout<<"Global double value of number ( ::x ): ";
 cout<<::x<<endl;
 {
       float x=2.5;
       cout<<x<<"\t"<<::x<<"\n";
 }
 cout<<x<<"\t"<<::x<<"\n";
 system("pause");
 return 0;
}
```

```
Local double value of number ( x ): 10.5
Global double value of number ( ::x ): 7
2.5     7
10.5    7
Press any key to continue . . .
```

```
// S05-07.cpp
// محاسبه فاکتوریل با تابع بازگشتی

#include "stdafx.h"
#include<iostream>

using namespace std;

long factorial(long num)
{
if(num==1)
  return 1;
else
  return (num*factorial(num-1));
}

int main(void)
{
int n,f;
cout<<"enter number : ";
cin>>n;
f=factorial(n);
cout<<"factorial "<<n<<" is : "<<f;
cout<<endl;
system("pause");
return 0;
}
```

```
enter number : 5
factorial 5 is : 120
Press any key to continue . . .
```

```
// S05-08.cpp
// محاسبه n امین عنصر سری فیبوناچی با تابع بازگشتی
// Fibonacci(n) : n=1,n=2  → 1
// Fibonacci(n) : n>1  → Fibonacci(n-1)+Fibonacci(n-2)
//  1   1  2   3   5   8   13 ..

#include "stdafx.h"
#include<iostream>

using namespace std;

int fib(int n)
{
 if((n==1)||(n==2))
  return 1;
 else
  return (fib(n-1)+fib(n-2));
}

int main(void)
{
 int result,number;
 cout<<"Enter one Number : ";
 cin>>number;
 result=fib(number);
 cout<<"Fibonacci "<<number<<" is : "<< result;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter one Number : 10
Fibonacci 10 is : 55
Press any key to continue . . .
```

```
// S05-09.cpp
 // Xn محاسبه بازگشتی

#include "stdafx.h"
#include <iostream>

using namespace std;

double power(double x,int n)
{
 if(n==0)
  return 1;
 else
  return (x*power(x,n-1));
}

int main(void)
{
double p,x;
int n;
cout<<"Enter base : ";
cin>>x;
cout<<"Enter exp : ";
cin>>n;
p=power(x,n);
cout<<"Result is : "<<p;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter base : 2
Enter exp : 6
Result is : 64
Press any key to continue . . .
```

```
// S05-10.cpp
// محاسبه Xn با استفاده از تابع سیستمی pow

#include "stdafx.h"
#include <iostream>
#include <math.h>

using namespace std;

int main(void)
{
 double x,n,p;
 cout<<"Enter base : ";
 cin>>x;
 cout<<"Enter exp : ";
 cin>>n;
 p=pow(x,n);
 cout<<"Result is : "<<p;
cout<<endl;
system("pause");
return 0;
}
```

```
Enter base : 3
Enter exp : 6
Result is : 729
Press any key to continue . . .
```

```
// S05-11.cpp
// حاصل جمع مربعات اعداد بین 1 تا 10 با تابع pow

#include "stdafx.h"
#include <iostream>
#include <math.h>

using namespace std;

int main(void)
{
//int i; --> Error in Function "pow"
double i,sum=0;
for(i=1;i<=10;i++)
  sum+=pow(i,2);
cout<<"Sum of first 10 squares of numbers is: ";
cout<<sum;
cout<<endl;
system("pause");
return 0;
}
```

```
Sum of first 10 squares of numbers is: 385
Press any key to continue . . .
```

```
// S05-12.cpp
// گرفتن ضرایب یک معادله درجه 2 و بدست آوردن جواب ها

#include "stdafx.h"
#include <iostream>
#include <math.h>

using namespace std;

int main(void)
{
 double a,b,c,d,x1,x2;
 cout<<"Enter a & b & c : ";
 cin>>a;
 cin>>b;
 cin>>c;
 d=pow(b,2)-4*a*c;
 if(d>0)
  {
   x1=(-b+sqrt(d))/(2*a);
   x2=(-b-sqrt(d))/(2*a);
   cout<<"the solutions are : ";
   cout<<x1<<" & "<<x2;
  }
  if(d==0)
  {
   x1=-b/(2*a);
   cout<<"the solution is : "<<x1;
  }
 if(d<0)
   cout<<"hasnot real solutions.";
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter a & b & c : 2 8 3
the solutions are : -0.418861 & -3.58114
Press any key to continue . . .
```

```
// S05-13.cpp
//محاسبه Xn با استفاده از هدر فایل مربوطه

#include "stdafx.h"
#include <iostream>
#include <mepower.h> //My Header File

using namespace std;

int main(void)
{
 double x,p;
 int n;
 cout<<"Enter base : ";
 cin>>x;
 cout<<"Enter exp : ";
 cin>>n;
 p=power(x,n);
 cout<<"Power is : "<<p;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
// include هدر فایل mepower.h ذخیره شده در فولدر
#include <iostream>

double power(double x , int n)
{
 int i;
 double p1=1;
 for(i=1;i<=n;i++)
   p1=p1*x;
 return(p1);
}
```

```
Enter base : 4
Enter exp : 3
Power is : 64
Press any key to continue . . .
```

```
// S05-14.cpp
// فراخوانی با مقدار

#include "stdafx.h"
#include <iostream>

using namespace std;

void change(int x,int y)
 {
  x++;
  y++;
  cout<<"\n\ninside change function ";
  cout<<"\nx = "<<x<<"\ty = "<<y<<"\n";
 }

int main (void)
{
 int a=10,b=10;
 cout<<"\na = "<<a<<"\tb = "<<b;
 change(a,b);
 cout<<"\ninside main ";
 cout<<"\na = "<<a<<"\tb = "<<b;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
a = 10  b = 10

inside change function
x = 11  y = 11

inside main
a = 10  b = 10
Press any key to continue . . .
```

```
// S05-15.cpp
// تفاوت فراخوانی با مقدار و ارجاع

#include "stdafx.h"
#include <iostream>

using namespace std;

void squareByReference(int &numberRef);

int main(void)
{
 int z=4;
 cout<<"z = "<<z<<" before squareByReference\n";
 squareByReference(z);
 cout<<"z = "<<z<<" after squareByReference\n";
 cout<<endl;
 system("pause");
 return 0;
}

void squareByReference(int &numberRef)
{
 numberRef*=numberRef;
}
```

```
z = 4 before squareByReference
z = 16 after squareByReference
Press any key to continue . . .
```

```
// S05-16.cpp
// پروسیجری که دو عدد را گرفته و آنها را با هم جابجا میکند

#include "stdafx.h"
#include <iostream>

using namespace std;

void exchange(int &x,int &y)
{
 int temp;
 temp=x;
 x=y;
 y=temp;
}

int main(void)
{
 int n1,n2;
 cout<<"Enter two number : ";
 cin>>n1>>n2;
 exchange(n1,n2);
 cout<<"numbers exchange : ";
 cout<<n1<<"\t"<<n2;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter two number : 10 25
numbers exchange : 25   10
Press any key to continue . . .
```

```
// S05-17.cpp
// کلاس حافظه استاتیک محلی و کلاس اتوماتیک

#include "stdafx.h"
#include <iostream>

using namespace std;

void test(void)
{
 int x=0;
 static int y=0;
 cout<<"\n auto x = "<<x<<" static y = "<<y;
 x++;
 y++;
}

int main(void)
{
 int i;
 for(i=1;i<=5;i++)
   test();
 cout<<endl;
 system("pause");
 return 0;
}
```

```
 auto x = 0 static y = 0
 auto x = 0 static y = 1
 auto x = 0 static y = 2
 auto x = 0 static y = 3
 auto x = 0 static y = 4
Press any key to continue . . .
```

```
// S05-18.cpp
// متغیر بلوکی داخلی و خارجی همنام

#include "stdafx.h"
#include <iostream>

using namespace std;

int main(void)
{
int x=5;
cout<<"x = "<<x;
cout<<"\n";
{
 int x=6;
 cout<<"x = "<<x;
 cout<<"\n";
}
cout<<"x = "<<x;
cout<<endl;
system("pause");
return 0;
}
```

```
x = 5
x = 6
x = 5
Press any key to continue . . .
```

```
// S05-19.cpp
// حوزه متغیرهای سراسری، محلی اتوماتیک و محلی استاتیک

#include "stdafx.h"
#include<iostream>

using namespace std;

void useLocal(void);
void useStaticLocal(void);
void useGlobal(void);
int x=1;

int main(void)
{
 int x=5;
 cout<<"local x in main's outer scope is "<<x;
 cout<<endl;
 {
   int x=7;
   cout<<"local x in main's inner scope is "<<x;
   cout<<endl;
 }
 cout<<"local x in main's outer scope is "<<x;
 cout<<endl;
 useLocal();
 useStaticLocal();
 useGlobal();
 useLocal();
 useStaticLocal();
 useGlobal();
 cout<<"\nlocal x in main is "<<x<< endl;
 cout<<endl;
 system("pause");
 return 0;
}

void useLocal(void)
{
 int x = 25;
 cout<<"\nlocal x is "<<x;
 cout<<" on entering useLocal"<<endl;
 x++;
 cout<<"local x is "<<x<<" on exiting useLocal";
 cout<<endl;
}

void useStaticLocal(void)
{
 static int x=50;
 cout<<"\nlocal static x is "<<x;
 cout<<" on entering useStaticLocal"<<endl;
 x++;
 cout<<"local static x is "<<x;
 cout<<" on exiting useStaticLocal "<<endl;
}

void useGlobal(void)
{
 cout<<"\nglobal x is "<<x;
 cout<<" on entering useGlobal"<<endl;
 x*=10;
 cout<<"global x is "<<x<<" on exiting useGlobal";
 cout<<"endl";
```

```
}
```

```
local x in main's outer scope is 5
local x in main's inner scope is 7
local x in main's outer scope is 5

local x is 25 on entering useLocal
local x is 26 on exiting useLocal

local static x is 50 on entering useStaticLocal
local static x is 51 on exiting useStaticLocal

global x is 1 on entering useGlobal
global x is 10 on exiting useGlobalendl
local x is 25 on entering useLocal
local x is 26 on exiting useLocal

local static x is 51 on entering useStaticLocal
local static x is 52 on exiting useStaticLocal

global x is 10 on entering useGlobal
global x is 100 on exiting useGlobalendl
local x in main is 5

Press any key to continue . . .
```

```
// S05-20.cpp
// inline محاسبه بزرگترین عدد بین 2 عدد با استفاده از تابع

#include "stdafx.h"
#include <iostream>

using namespace std;

inline void max(int i,int j)
{
 cout<<"Max is : ";
 if(i<j)
   cout<<j;
 else
   cout<<i;
}

int main(void)
{
 int x , y;
 cout<<"Enter number1 : ";
 cin>>x;
 cout<<"Enter number2 : ";
 cin>>y;
 max(x,y);
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter number1 : 8
Enter number2 : 15
Max is : 15
Press any key to continue . . .
```

```
// S05-21.cpp
// تابع فاکتوریل با آرگومان دارای مقدار پیش فرض

#include "stdafx.h"
#include <iostream>

using namespace std;

long int fact(int n=5)
 {
  int i;
  long int f=1;
  for(i=1;i<=n;i++)
      f=f*i;
  return(f);
 }

int main(void)
{
 long int f;
 f=fact(6);
 cout<<"\n factorial(6) = "<<f;
 f=fact();
 cout<<"\n factorial(5) = "<<f;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
 factorial(6) = 720
 factorial(5) = 120
Press any key to continue . . .
```

```
// S05-22.cpp
// ماکزیمم 2 عدد صحیح و 2 عدد اعشاری با 2 تابع همنام

#include "stdafx.h"
#include <iostream>

using namespace std;

int max(int i,int j)
{
 int max;
 if(i>j)
   max=i;
 else
  max=j;
 return(max);
}

float max(float f1 ,float f2)
{
 float max;
 if(f1>f2)
   max=f1;
 else
  max=f2;
 return(max);
}

int main(void)
{
 int num1,num2,max_int;
 float f1,f2,max_float;
 cout<<"Enter two integers : ";
 cin>>num1>>num2;
 max_int=max(num1,num2);
 cout<<"Maximum of two integers is : ";
 cout<<max_int<<"\n";
 cout<<"Enter two reals : ";
 cin>>f1>>f2;
 max_float=max(f1,f2);
 cout<<"Maximum of two reals is : ";
 cout<<max_float<<"\n";
 system("pause");
 return 0;
}
```

```
Enter two integers : 5 8
Maximum of two integers is : 8
Enter two reals : 12.5 18.75
Maximum of two reals is : 18.75
Press any key to continue . . .
```

```
// S05-23.cpp
// template یافتن بزرگترین مقدار بین 3 ورودی با تابع

#include "stdafx.h"
#include<iostream>

using namespace std;

template <class T>
T maximum(T value1,T value2,T value3)
{
 T maximumValue=value1;
 if(value2>maximumValue)
    maximumValue=value2;
 if(value3>maximumValue)
    maximumValue=value3;
 return maximumValue;
}

int main(void)
{
 int int1,int2,int3;
 cout<<"Input three integer values : ";
 cin>>int1>>int2>>int3;
 cout<<"The maximum integer value is : ";
 cout<<maximum(int1,int2,int3);
 double double1,double2,double3;
 cout<<"\nInput three double values : ";
 cin>>double1>>double2>>double3;
 cout<<"The maximum double value is : ";
 cout<<maximum(double1,double2,double3);
 char char1,char2,char3;
 cout<<"\nInput three characters : ";
 cin>>char1>>char2>>char3;
 cout<<"The maximum character value is : ";
 cout<<maximum(char1,char2,char3);
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Input three integer values : 2 3 5
The maximum integer value is : 5
Input three double values : 12.5 13.75 15.64
The maximum double value is : 15.64
Input three characters : d h w
The maximum character value is : w
Press any key to continue . . .
```

```
// P05-01.cpp
// گرفتن شعاع کره و محاسبه حجم آن با تابع

#include "stdafx.h"
#include <iostream>
#include <math.h>

using namespace std;

double SphereVolume(double r)
{
 double s;
 s=(4.0/3.0)*3.14*pow(r,3);
 return s;
}

int main(void)
{
 double r,s;
 cout<<"Enter radius : ";
 cin>>r;
 s=SphereVolume(r);
 cout<<"SphereVolume is : ";
 cout<<s;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter radius : 5
SphereVolume is : 523.333
Press any key to continue . . .
```

```
// P05-02.cpp
// محاسبه وتر مثلث قائم الزاویه با گرفتن دو ضلع ان با تابع

#include "stdafx.h"
#include <iostream>
#include <math.h>

using namespace std;

double hypotenuse(double side1,double side2)
{
  double h,p1,p2;
  p1=pow(side1 , 2);
  p2=pow(side2 , 2);
  h=sqrt(p1+p2);
  cout<<h;
  return h;
}

int main(void)
{
  double s1,s2,h;
  cout<<"Enter Side1 : ";
  cin>>s1;
  cout<<"Enter Side2 : ";
  cin>>s2;
  h=hypotenuse(s1,s2);
  cout<<"\nhypotenuse is : "<<h;
  cout<<endl;
  system("pause");
  return 0;
}
```

```
Enter Side1 : 10
Enter Side2 : 15
18.0278
hypotenuse is : 18.0278
Press any key to continue . . .
```

```
// P05-03.cpp
// گرفتن 2 عدد و تعیین اینکه عدد اول مضرب دومی هست یا نه؟

#include "stdafx.h"
#include<iostream>

using namespace std;

bool multiple(int num1 , int num2)
{
 if(num1%num2==0)
  return true;
 else
  return false;
}

int main(void)
{
 int a,b;
 cout<<"Enter First Number : ";
 cin>>a;
 cout<<"Enetr Second Number : ";
 cin>>b;
 if(multiple(a,b))
  cout<<"first number is multiple second number";
 else
  cout<<"first number isn't multiple second number";
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Enter First Number : 35
Enetr Second Number : 5
first number is multiple second number
Press any key to continue . . .
```

```
// P05-04.cpp
// چاپ اعداد اول بین 2 تا 100 با تابع

#include "stdafx.h"
#include <iostream>

using namespace std;

bool pro(int n)
{
 int count=0,i;
 for(i=1;i<=n;i++)
  if(n%i==0)
    count++;
 if(count==2)
  return true;
 else
  return false;
}

int main(void)
{
 int i;
 for(i=2;i<=100;i++)
   if(pro(i)==true)
      cout<<i<<"  ";
 cout<<endl;
 system("pause");
 return 0;
}
```

```
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
Press any key to continue . . .
```

```
// P05-05.cpp
// ضرب 2 عدد با استفاده از تابع بازگشتی و عمل جمع

#include "stdafx.h"
#include <iostream>

using namespace std;

int product(int ,int);

int main(void)
{
 int x,y;
 cout<<"Enter two integers : ";
 cin>>x>>y;
 cout<<"The result is : "<< product(x,y);
 cout<<endl;
 system("pause");
 return 0;
}

int product(int a,int b)
{
 if(b==1)
   return a;
 else
   return (a+product(a,b-1));
}
```

```
Enter two integers : 5 4
The result is : 20
Press any key to continue . . .
```

```
// P05-06.cpp
// تفاوت فراخوانی با مقدار و ارجاع //

#include "stdafx.h"
#include <iostream>

using namespace std;

int squareByValue(int);
void squareByReference(int &);

int main(void)
{
 int x=2;
 int z=4;
 cout<<"x = "<<x<<" before squareByValue\n";
 cout<<"Value returned by squareByValue ";
 cout<<squareByValue(x)<<endl;
 cout<<"x = "<<x<<" after squareByValue"<<endl;
 cout<<"z = "<<z<<" before squareByReference\n";
 squareByReference(z);
 cout<<"z = "<<z<<" after squareByReference\n";
 cout<<endl;
 system("pause");
 return 0;
}

int squareByValue(int number)
{
 return number*=number;
}

void squareByReference(int &numberRef)
{
 numberRef *= numberRef;
}
```

```
x = 2 before squareByValue
Value returned by squareByValue 4
x = 2 after squareByValue
z = 4 before squareByReference
z = 16 after squareByReference
Press any key to continue . . .
```

```
// P05-07.cpp
// template دریافت دو مقدار و تعویض آنها با

#include "stdafx.h"
#include <iostream>

using namespace std;

template<class T>
void exchange(T &value1,T &value2)
{
 T temp;
 temp=value1;
 value1=value2;
 value2=temp;
}

int main(void)
{
 int int1,int2;
 cout<<"Input two integer values : ";
 cin>>int1>>int2;
 exchange(int1,int2);
 cout<<"The Exchange is: "<<int1<<"  "<<int2;
 double d1,d2;
 cout<<"\nInput two double values : ";
 cin>>d1>>d2;
 exchange(d1,d2);
 cout<<"The Exchange is : "<<d1<<"  "<<d2;
 char char1,char2;
 cout<<"\nInput two characters : ";
 cin>>char1>>char2;
 exchange(char1,char2);
 cout<<"The Exchange is: "<<char1<<"  "<<char2;
 cout<<endl;
 system("pause");
 return 0;
}
```

```
Input two integer values : 5 20
The Exchange is: 20  5
Input two double values : 12.5 17.75
The Exchange is : 17.75  12.5
Input two characters : a g
The Exchange is: g  a
Press any key to continue . . .
```