

ساختارهای انتخاب

مبانی برنامه‌نویسی

(۱۳۹۱-۱۳۹۰-۱۱)

جلسه‌ی سیزدهم



دانشگاه شهید بهشتی

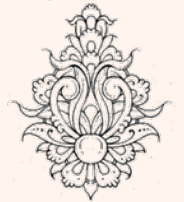
پاییز ۱۳۹۳

دانشکده‌ی مهندسی برق و کامپیوتر

احمد محمودی ازناوه

فهرست مطالب

- مروری بر جلسه‌ی پیش
- انواع عملگرها و اولویت‌ها
- شیفت مسابی و شیفت منطقی
- ساختار انتخاب



شیفت منطقی در برابر شیفت حسابی

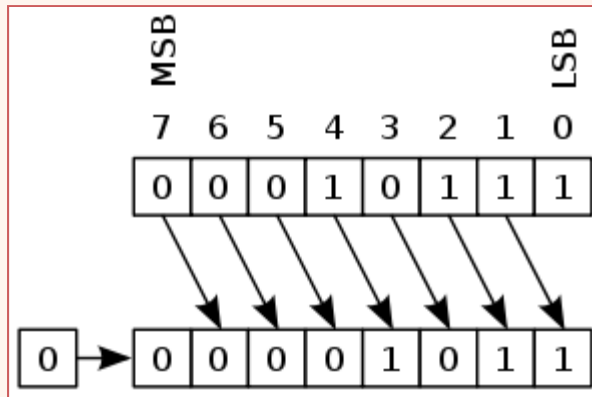
```
#include <iostream>
using namespace std;

int main() {
    cout << "5 times 2 is " << (5 << 1) << endl
         << "20 divided by 4 is " << (20 >> 2) << endl;
}
```

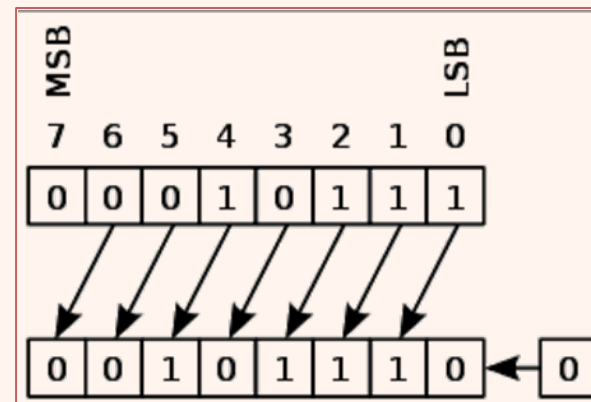
```
5 times 2 is 10
20 divided by 4 is 5
```

شیفت منطقی

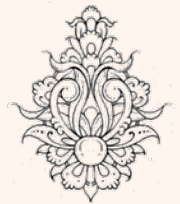
Logical shift



Logical right shift one bit



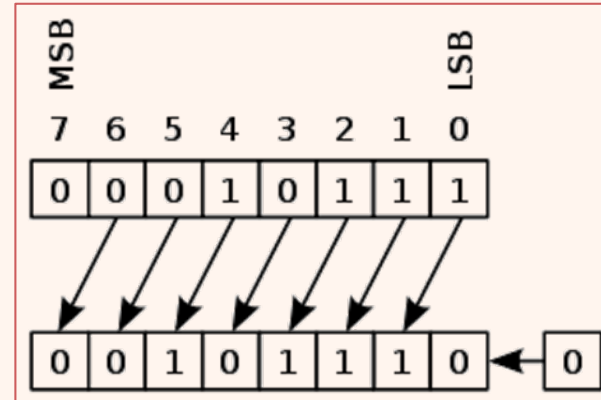
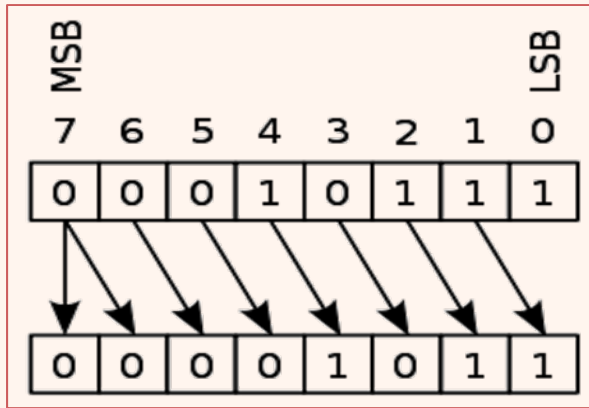
Logical left shift one bit



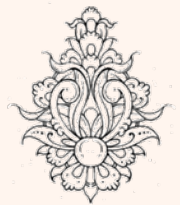
شیفت منطقی در برابر شیفت حسابی (ادامه...)

شیفت حسابی

Arithmetic shift or sign shift

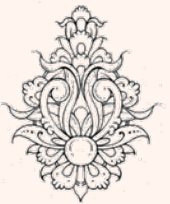


the operand is a signed integer



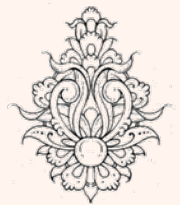
جدول اولویت‌ها

Precedence	Operator	Grouping
1	::	From left to right
2	. -> [] ++ (“postfix”) -- (“postfix”) name() typeid() type() dynamic_cast<> static_cast<> const_cast<> reinterpret_cast<>	From left to right
3	! ~ + (“unary”) - (“unary”) ++ (“prefix”) -- (“prefix”) & (“address”) - (“indirection”) New new[] delete delete[] (type) sizeof()	From left to right
4	.* ->*	From left to right
5	* / %	From left to right



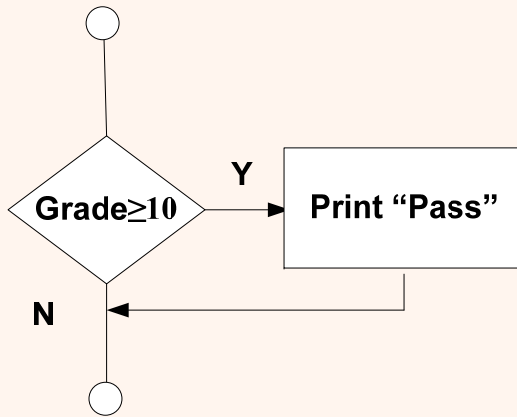
جدول اولویت‌ها (ادامه...)

6	+(“binary”)	- (“binary”)	From left to right
7	>>	<<	From left to right
8	< <=	> >=	From left to right
9	==	!=	From left to right
10	&(“bit-wiee-AND”)		From left to right
11	^		From left to right
12			From left to right
13	&&		From left to right
14			From left to right
15	?:		From left to right
16	= +=	-= *= /+	From left to right
	&= ^=	%= = <<= >>=	
17		,	From left to right



ساختار انتخاب if

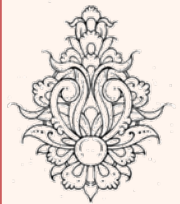
- از نماد لوزی در روندنما برای نمایش ساختار انتخاب if استفاده می‌شود.



دستورات (ات) (شرط) if

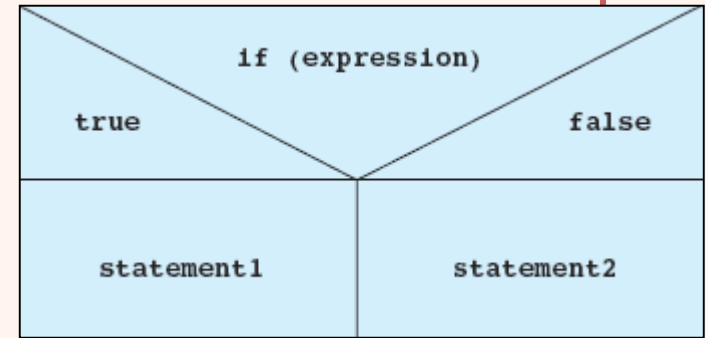
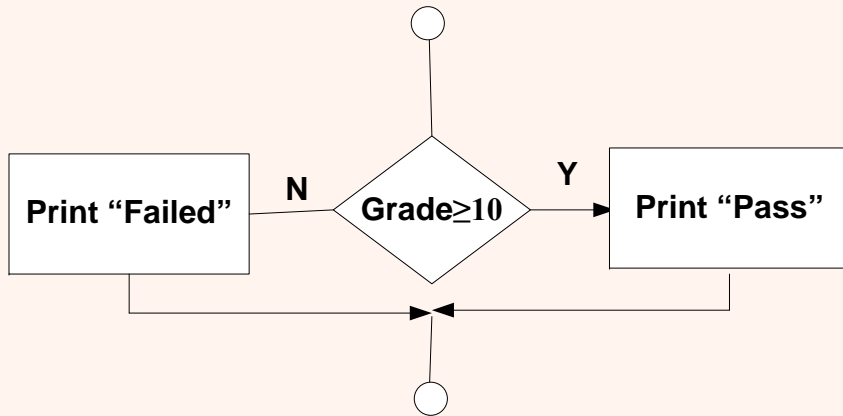
مثال

```
#include <iostream>
using namespace std;
int main()
{ int n,d;
cout << "Enter two positive integers: ";
cin >> n >> d;
if (n%d) cout << n << " is not divisible by " << d << endl;
}
```



```
Enter two positive integers: 6 4
6 is not divisible by 4
```

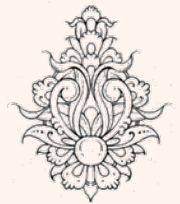
ساختار انتخاب if-else



دستورات (شرط) if
دستورات else

```
#include <iostream>
using namespace std;
int main()
{ int n,d;
  cout << "Enter two positive integers: ";
  cin >> n >> d;
  if (n%d) cout << n << " is not divisible by " << d << endl;
  else cout << n << " is divisible by " << d << endl;
}
```

```
Enter two positive integers: 4 3
4 is not divisible by 3
```




```
#include <iostream>
using namespace std;
int main()
{ int n;
cout << "Enter an integer: ";
cin >> n;
if (n = 22) cout << n << " = 22" << endl; // LOGICAL ERROR!
else cout << n << " != 22" << endl;
}
```

```
Enter an integer: 77
22 = 22
```

// LOGICAL ERROR!

```
int main()
{ int n;
cout << "Enter an integer: ";
cin >> n;
if (n == 22) cout << n << " = 22" << endl;
else cout << n << " != 22" << endl;
}
```

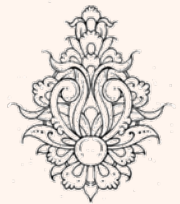
```
Enter an integer: 77
77 != 22
```



• کمترین مقدار سه عدد

```
int main()
{ int n1,n2,n3;
cout << "Enter three integers: ";
cin >> n1 >> n2 >> n3;
int min=n1;
if (n2 < min) min = n2;
if (n3 < min) min = n3;
cout << "Their minimum is " << min << endl;
}
```

```
Enter three integers: 22 11 66
Their minimum is 11
```

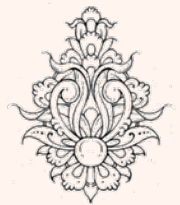


• جابه‌جایی دو عدد

```
int main()
{ int x,y;
cout << "Enter two integers: ";
cin >> x >> y;
if (x > y) { int temp=x; x = y; y = temp; } // swap x and y
cout << x << " <= " << y << endl;
}
```

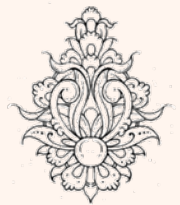
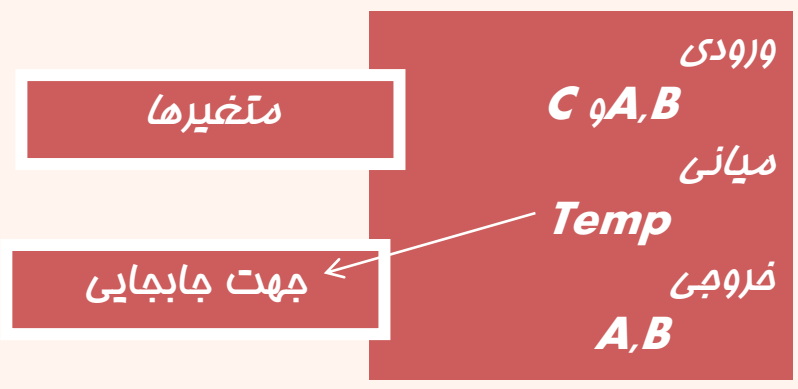
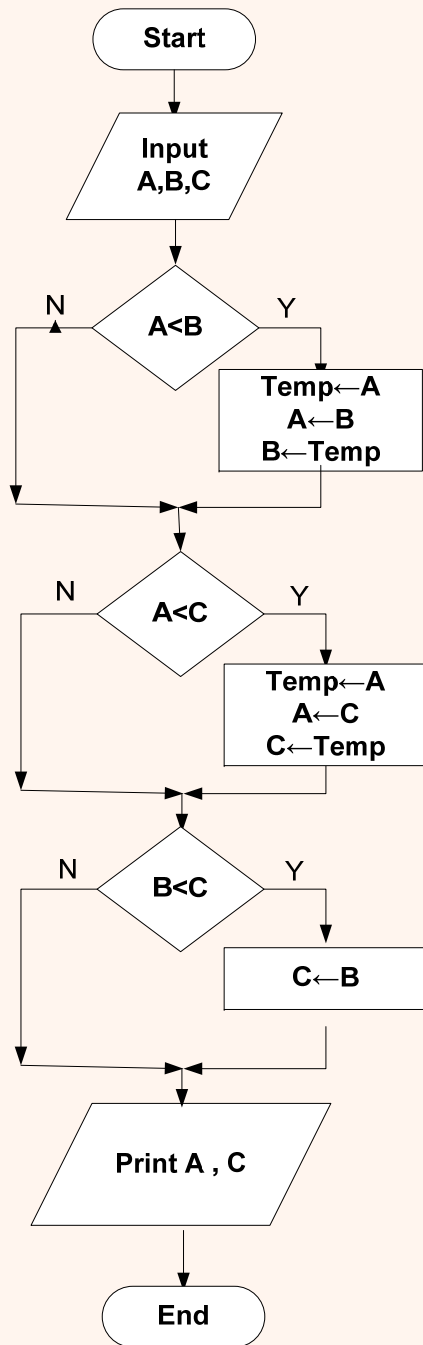
```
Enter two integers: 34 13
13 <= 34
```

اگر دستورات پس از شرط بیش از یک خط باشد
ناچار به تعریف بلوک خواهیم بود

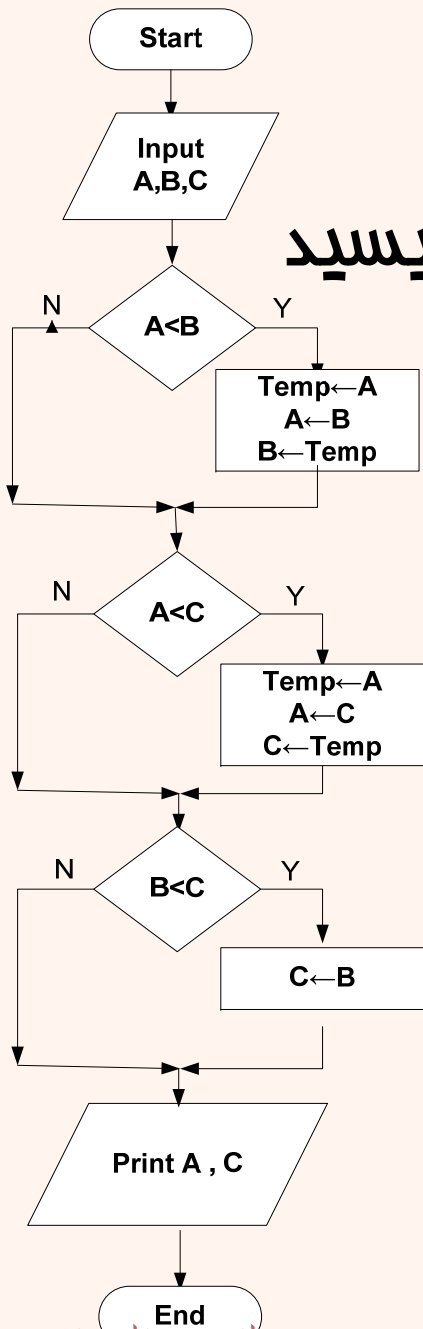


مثال

- سه عدد A, B, C را از ورودی دریافت کرده، بزرگ‌ترین و کوچک‌ترین عدد را نمایش دهید. (بزرگ‌ترین عدد را در A و کوچک‌ترین را در C ذخیره نمایید)



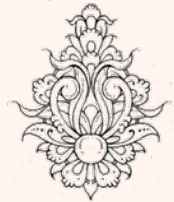
• برنامه‌ی مرتب با روندنمای قبل را بنویسید



```
int main()
{ int A,B,C;
cout << "Enter three integers:\n ";
cout << "The 1th: ";
cin >> A;
cout << "The 2th: ";
cin >> B;
cout << "The 3th: ";
cin >> C;
if (B > A)
    { int temp=A; A = B; B = temp; }
if (C > A)
    { int temp=A; A = C; C = temp; }
if (C > B)
    { int temp=C; C = B; B = temp; }

cout << "The Min(C) is " << C << endl;
cout << "The Max(A) is " << A << endl;
}
```

```
Enter three integers:
The 1th: 12
The 2th: 23
The 3th: 37
The Min(C) is 12
The Max(A) is 37
```



انتخاب‌های تودرتو

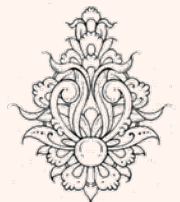
```
int main()
{ int n,d;
cout << "Enter two positive integers: ";
cin >> n >> d;
if (d != 0)
    if (n%d == 0)
        cout << d << " divides " << n << endl;
    else
        cout << d << " does not divide " << n << endl;
else
    cout << d << " does not divide " << n << endl;
}
```

```
Enter two positive integers: 22 11
11 divides 22
```

```
Enter two positive integers: 22 5
5 does not divide 22
```

```
Enter two positive integers: 22 0
0 does not divide 22
```

Match each else with the last unmatched if.



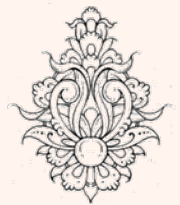
شیوهی صحیح و خواندنی

Bad Coding Style

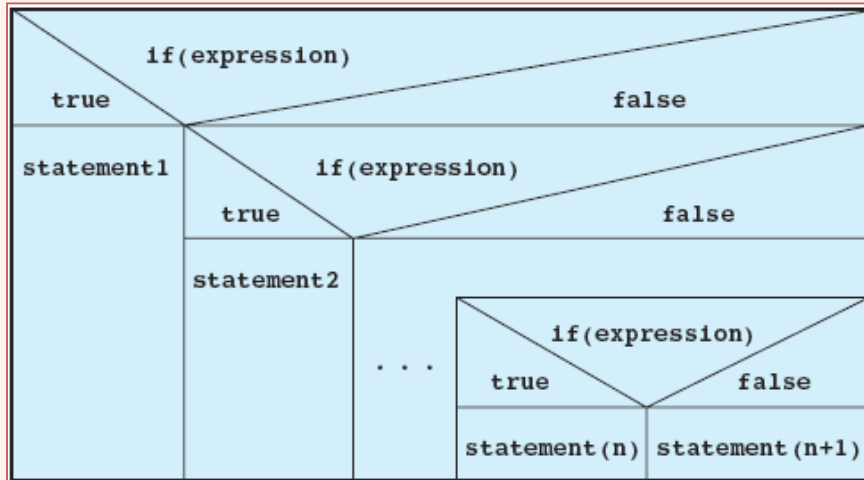
```
if (a > 0) if (b > 0) ++a; else if (c > 0)
if (a < 4) ++b; else if (b < 4) ++c; else --a;
else if (c < 4) --b; else --c; else a = 0;
```

```
if (a > 0)
  if (b > 0) ++a;
  else
    if (c > 0)
      if (a < 4) ++b;
      else
        if (b < 4) ++c;
        else --a;
    else
      if (c < 4) --b;
      else --c;
else a = 0;
```

```
if (a > 0)
  if (b > 0) ++a;
  else if (c > 0)
    if (a < 4) ++b;
    else if (b < 4) ++c;
    else --a;
  else if (c < 4) --b;
  else --c;
else a = 0;
```



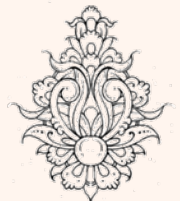
if-else زنجیره‌ی



```
if ( expression1 )
    statement1
else if( expression2 )
    statement2
.
.
.
else if( expression(n) )
    statement (n)
[ else statement(n+1)]
```

```
int main()
{
float limit, speed, toofast;
cout << "\nSpeed limit: ";
cin >> limit;
cout << "\nSpeed: ";
cin >> speed;
    if ((toofast = speed - limit)< 10)
        cout << "You were lucky!" << endl;
    else if( toofast < 20)
        cout << "Fine payable: 40,-. Dollars" << endl;
    else if( toofast < 30)
        cout << "Fine payable: 80,-. Dollars" << endl;
    else
        cout << "Hand over your driver's license!" << endl;
return 0;
```

```
Speed limit: 60
Speed: 85
Fine payable: 80,-. Dollars
```



The arithmetic if operator

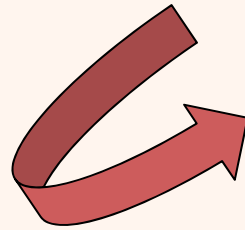
– عملگر ؟ با بررسی شرط (همراه با انتقال بہ متغیر):

Variable = exp1 ? exp2 : exp3

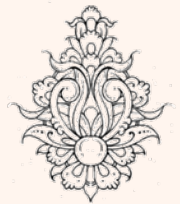
– عملگر ؟ با بررسی شرط (اجرای دستورات):

Exp1 ? do something 1: do something 2

```
z = (a >= 0) ? a : -a;
```



```
if( a > 0 )  
    z = a;  
else  
    z = -a;
```



```
#include <iostream>
using namespace std;
int main()
{ int m,n;
cout << "Enter two integers: ";
cin >> m >> n;
cout << ( m<n ? m : n ) << " is the minimum." << endl;
}
```

```
Enter two integers: 23 45
23 is the minimum.
```

