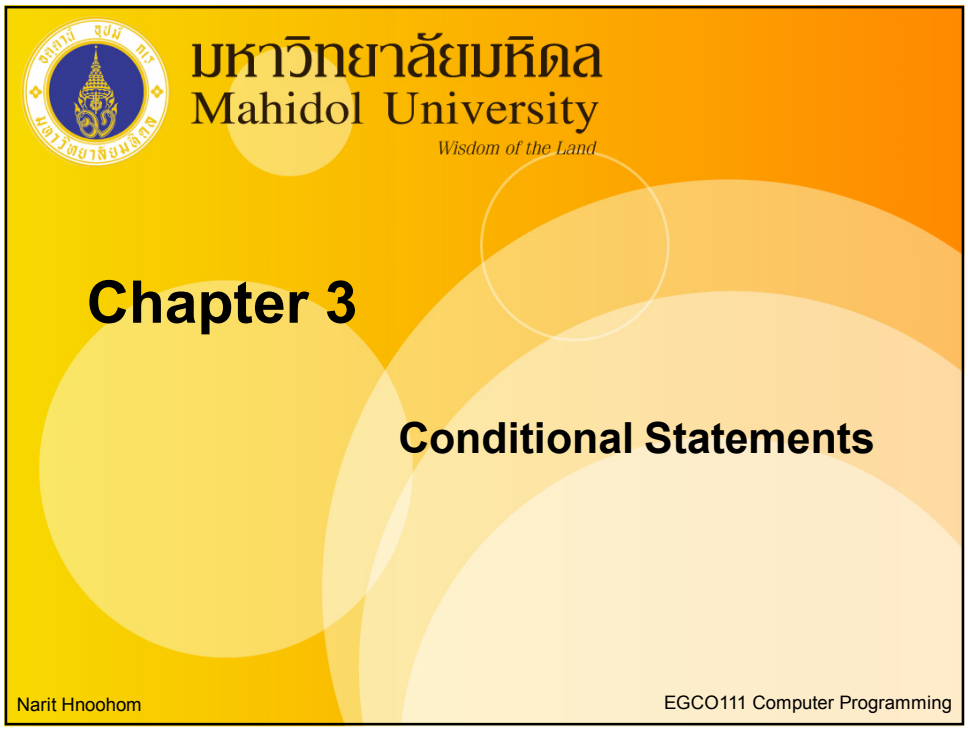


Boolean & Logical Operators

- **Boolean Operator**

Operator	Meaning	Example
==	equal	x==3
!=	not equal	x!=y
>	grater	x>2
<	less	x<5
>=	grater than or equal	x>=y
<=	less than or equal	x<=y

- **Logical Operator**

Operand		Not	AND	OR
A	B	A!	A&&B	A||B
1	1	0	1	1
1	0	0	0	1
0	1	1	0	1
0	0	1	0	0

Precedence of Boolean & Logical Operators
1. Parentheses
2. NOT, AND, OR

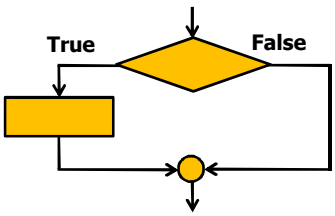
Conditional Statements

Conditional Statements

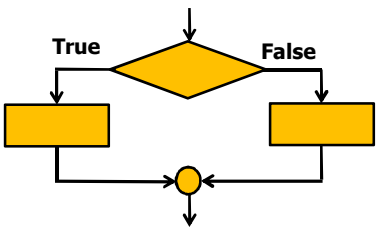
- If statement
- If-else statement
- Switch statement

Conditional Structure

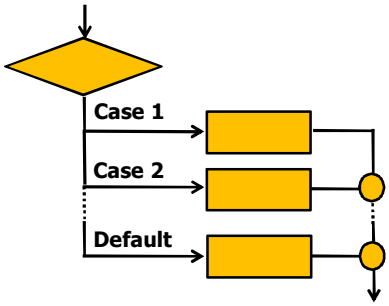
If statement



If-else statement

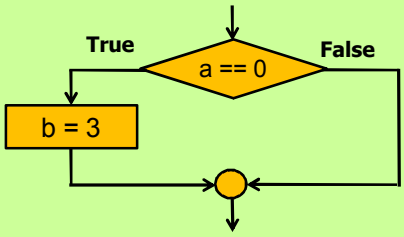


Switch statement



If Statement

- **Syntax**
  if (boolean_expression) statement;
  - statement is executed if boolean_expression evaluates to true.
- **Example**
  if (a == 0) b = 3;



Example of If Statement

- **Example1**

```
1  #include <stdio.h>
2  main()
3  {
4     int a, b=0;
5     printf("Enter your number: ");
6     scanf("%d", &a);
7     if (a == 0) b=3;
8     printf("b=%d", b);
9  }
```

- **Result:**
  Enter your number: **5**
  b = 0
- **Result:**
  Enter your number: **0**
  b = 3

Example of If Statement

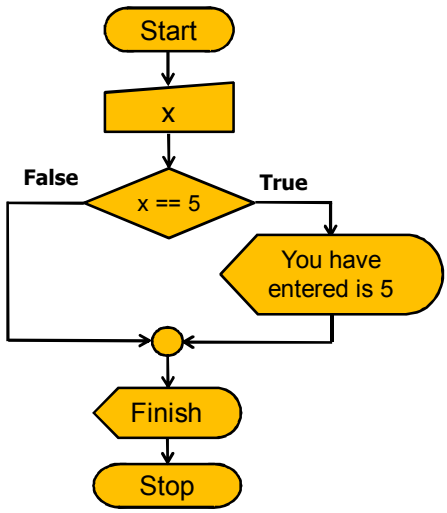
- **Example2**

```
1  #include <stdio.h>
2  main()
3  {
4     int x;
5     printf("Enter your number: ");
6     scanf("%d", &x);
7     if (x == 5) printf("\nYou have entered is 5");
8     printf("\nFinish");
9  }
```

- **Result:**
  Enter your number: **5**
  You have entered is 5
  Finish

- **Result:**
  Enter your number: **3**
  Finish

Example of If Statement



Exercise of If Statement

- **Write a program to find the largest value of two numbers (x and y)**
  - Get two integer numbers from keyboard
- **Example of result:**

  Enter two numbers(x y): **4 4**
  x is equal to y
  Finish
  Enter two numbers(x y): **3 2**
  x is greater than y
  Finish
  Enter two numbers(x y): **2 3**
  x is smaller than y
  Finish

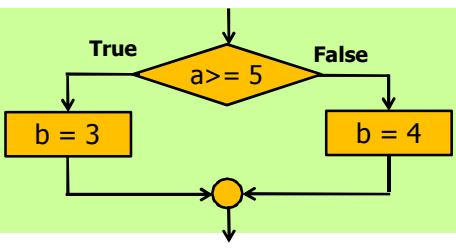
If-else Statement

- **Syntax**

  if (boolean_expression) statement1;
  else statement2;

  - If boolean_expression is not equal to 0 then statement1 is executed, but if boolean_expression is equal to 0 then statement2 is executed.
- **Example**

  if (a >= 5) b = 3;
  else b = 4;



Example of If-else Statement

- **Example1**

```
1   #include <stdio.h>
2   main()
3   {
4       int age;
5       printf("How old are you?: ");
6       scanf("%d", &age);
7       if (age < 17) printf("\nYou are less than 17 years old");
8       else printf("\nYou are greater than 17 years old");
9       printf("\nFinish");
10  }
```

- **Result:**

  How old are you?: **16**
  You are less than 17 years old
  Finish

- **Result:**

  How old are you?: **18**
  You are greater than 17 years old
  Finish

Exercise of If-else Statement

- **Write a program to check whether two numbers entered are positive or negative**
  - Get two integer numbers from keyboard
- **Example of result:**

  Enter your numbers: **2:3**
  Your numbers are positive
  Finish

  Enter your numbers: **3:-5**
  One number is negative
  Finish

Statements and Statement-Blocks

- **C compiler allows grouping of a sequence of statements into a block.**
- **A statement-block is treated as a single statement.**

- **Example**

```
if (a > b)
{
   max = a;       // statement block in then-block
   z++;
}
else
   max = b;      // single statement in else-block
```


Exercise of Statements and Statement-Blocks

- **Write a program to check whether two numbers entered are positive or negative**
  - Moreover, the values of two numbers are displayed.

- **Example of result:**

Enter your numbers: **2:3**
Your numbers are positive
Your numbers entered are 2 and 3
Finish

Enter your numbers: **3:-5**
One number is negative
Your numbers entered are 3 and -5
Finish

Question

- **What are the outputs?**

Example1

```
if (a>b)
{
   if (a > 0) max = a;
}
else
    max = b;
```

Example2

```
if (a>b)

  if (a > 0) max = a;

else
  max = b;
```


Exercise of If-else Statement

- **Write a program to check whether a number entered is negative and even or positive and odd**
  - Get an integer number from keyboard
- **Example of result:**

Enter your number: **2**
Positive and even
Finish

Enter your number: **-6**
Negative and even
Finish

Enter your number: **3**
Positive and odd
Finish

Enter your number: **-5**
Negative and odd
Finish

Exercise of If-else Statement

- **Write a program to calculate the student grade according to total marks obtained**
  - Get an integer number of total marks from keyboard

Total marks	Grade
More than 80	A
71 – 80	B
61 – 70	C
51 – 60	D
Less than 51	F

- **Example of result:**

  Enter your total marks: 85

  Your grade is A

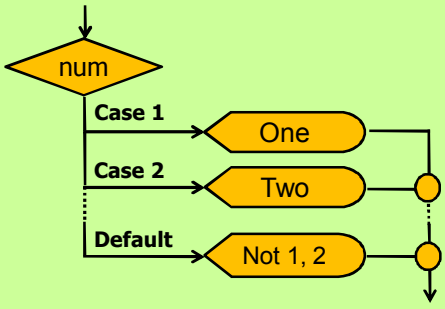
Switch-case Statement

Syntax:

```
switch (expression)
{  case value1:
        statement_sequence1;
        break;
   case value2:
        statement_sequence2;
        break;
   case value3:
   ....
   ....
   default:
        statement_sequence;
}
```

- **Example**

```
switch (num)
{
    case 1: printf("One"); break;
    case 2: printf("Two"); break;
    default: printf("Not 1, 2");
}
```



Switch-case Statement

- The value of **expression** is compared with every literal **valueX** starting from the beginning of the switch-block.
- All statements after the first matching case will be executed until **break** or **return** is reached.
- The optional **default** case is executed if there was no matching case found.

Note 1: If breaks or returns are omitted we can fall through multiple case statements until either a break/return is found or the end of the switch case statement is reached.
Note 2: If the **default** case is omitted the switch statement does nothing if none of the cases.

Example of Switch-case Statement

- **Example1**

```
1  #include <stdio.h>
2  main()
3  {
4     int grade;
5     printf("Enter a grade (0-4): ");
6     scanf("%d", &grade);
7      switch (grade) {
8           case 4: printf("I got an A \n"); break;
9           case 3: printf("I got a B \n"); break;
10          case 2: printf(I got a C \n"); break;
11          case 1: printf("I got a D \n"); break;
12          case 0: printf("I got a F \n"); break;
13          default: printf("I don't what I got \n");
14    }
15 }
```

- **Result:**
  Enter a grade (0-4): **3**
  I got a B

If-case Statement vs. Switch-case Statement

- **If-else statements can be substituted with switch-case statement.**

```
#include <stdio.h>
main()
{
 int grade;
 printf("Enter a grade (0-4): ");
 scanf("%d", &grade);
 if (grade==4) printf("I got an A");
 else if (grade==3) printf("I got a B");
 else if (grade==2) printf(("I got a C");
 else if (grade==1) printf("I got a D");
 else if (grade==0) printf("I got a F");
 else printf("I don't know what I got");
}
```

```
#include <stdio.h>
main()
{
  int grade;
  printf("Enter a grade (0-4): ");
  scanf("%d", &grade);
  switch (grade) {
    case 4: printf("I got an A");break;
    case 3: printf("I got a B"); break;
    case 2: printf(I got a C"); break;
    case 1: printf("I got a D"); break;
    case 0: printf("I got a F"); break;
    default: printf("I don't what I got");
  }
}
```


Question

- **What are the outputs?**

```
1  #include <stdio.h>
2  main()
3  {
4      int grade;
5      printf("Enter a grade (0-4): ");
6      scanf("%d", &grade);
7       switch (grade) {
8            case 4: printf("I got an A \n");
9            case 3: printf("I got a B \n");
10           case 2: printf(I got a C \n");
11           case 1: printf("I got a D \n");
12           case 0: printf("I got a F \n");
13           default: printf("I don't what I got \n");
14     }
15 }
```

What would happen if there omit the break statement ?

Question

- **What are the outputs?**

```
1  #include <stdio.h>
2  main()
3  {
4     int grade;
5     printf("Enter a grade (0-4): ");
6     scanf("%d", &grade);
7      switch (grade) {
8           case 4: printf("I got an A \n");
9           case 3: printf("I got a B \n");
10          case 2: printf(I got a C \n");
11          case 1: printf("I got a D \n"); break;
12          case 0: printf("I got a F \n");
13          default: printf("I don't what I got \n");
14    }
15 }
```


Question

- **What are the outputs?**

```
1  #include <stdio.h>
2  main()
3  {
4     int grade;
5     printf("Enter a grade (0-4): ");
6     scanf("%d", &grade);
7      switch (grade) {
8           case 4: printf("I got an A \n"); break;
9           case 3: printf("I got a B \n"); break;
10          case 2: printf(I got a C \n"); break;
11          case 1: printf("I got a D \n"); break;
12          case 0: printf("I got a F \n"); break;
13     }
14 }
```

What would happen if there omit the default case ?

Example of Switch-case Statement

- **Example2**

```
1  #include <stdio.h>
2  main() {
3      char ch; int x=0,y=2, z=3;
4      printf("Enter an operator (+, -, *, / ): ");
5      scanf("%c", &ch);
6      switch (ch) {
7          case '+': x = y + z; break;
8          case '-': x = y - z; break;
9          case '*': x = y * z; break;
10         case '/': x = y / z; break;
11          default: printf("Not +, -, *, / \n");
12     }
13      printf ("x=%d, y=%d, z=%d", x,y,z);
14 }
```


Example of Switch-case Statement

- **Example2**

```
1  #include <stdio.h>
2  main() {
3      char ch; int x=0,y=2;
4      printf("Enter an operator (+, -, *, / ): ");
5      scanf("%c", &ch);
6      switch (ch) {
7          case '+': x += y; break;
8          case '-': x -= y; break;
9          case '*': x *= y; break;
10         case '/': x /= y; break;
11          default: printf("Not +, -, *, / \n");
12     }
13      printf ("x=%d, y=%d", x,y);
14 }
```

Exercise of Switch-case Statement

- **Write a program to check whether a number entered is the college year**
  - Get an integer number of the college year from keyboard
  - The detail in each choice is: 1)Freshman, 2)Sophomore, 3)Junior, 4)Senior, and 5)Super Senior
- **Example of result:**

Enter your college year: 2
Sophomore

Enter your college year: 8
Cannot answer

Exercise of If-case Statement

- **Write a program to check whether a number entered is the college year**
  - Get an integer number of the college year from keyboard
  - The detail in each choice is: 1)Freshman, 2)Sophomore, 3)Junior, 4)Senior, and 5)Super Senior
- **Example of result:**

Enter your college year: 2
Sophomore

Enter your college year: 8
Cannot answer

Scanf vs. Gets

- **Scanf**

```
1  #include <stdio.h>
2  main()
3  {
4     char name[30];
5     printf("Enter your name: ");
6     scanf("%s",&name);
7     printf("Sawadee, %s",name);
8  }
```

- **Result:**

  Enter your name: **Cee rukrean**

  Sawadee, Cee

- **Gets**

```
1  #include <stdio.h>
2  #include <conio.h>
3  main()
4  {
5     char name[30];
6     printf("Enter your name: ");
7     gets(name);
8     printf("Sawadee, %s",name);
9  }
```

- **Result:**

  Enter your name: **Cee rukrean**

  Sawadee, Cee rukrean

Thanks for your attention