

# PEN203

Structured Program  
Development in C++

**C++ How to Program  
Deitel & Deitel**

## Outline

- Algorithms
- Pseudocode
- Control Structures
- The if Selection Statement
- The if...else Selection Statement
- The while Repetition Statement

## Algorithms

- Algorithm is defined as the actions to be executed in a specific order to solve a given problem.
- Program control is an important concept and it defines the specific order in which statements are to be executed.

## Pseudocode

- Artificial or informal language which is used to develop algorithms
- Pseudocodes are not executed on computers.
- They are similar to everyday English.
- Pseudocodes can be converted easily to C++ program.

## Control Structures

- All programs can be written in terms of 3 control structures:
  - Sequence structures: Statements executed sequentially. It is default control structure.
  - Selection structures: if, if-else, switch.
  - Repetition structures: while, do-while, for.

## The if selection statement

- Used to choose among alternative actions:
- Pseudocode of if:
  - If student's grade is less than 50  
print "Failed"
  - If the condition returns true, print statement is executed.
  - If the condition returns false, the body of if is not executed. Program control goes to next statement after if block.

## The if selection statement

- Pseudocode statement is transferred to C++ program as follows:

```
if(grade<50)
```

```
    cout<<"Passed\n";
```

- Indentation improves program readability.
- C++ ignores whitespace characters (space, tab, and newline).

## The if-else selection statement

- This statement specifies an action for both true condition and false condition.
- Psuedocode of if-else:  
    If student' grade is less than 50  
        Print "Failed"  
    else  
        Print "Passed"



## The if-else selection statement

- C++ code :

```
if (grade < 50)
    cout << "Failed\n";
else
    cout << "Passed\n";
```

- Ternary conditional operator (?:)

- It has three arguments (condition, value if true, value if false)

- `grade >= 60 ? cout << "Passed\n" : cout << "Failed\n";`

## The if-else selection statement

- **Nested if-else statements**
  - They are used to test for multiple cases.
  - if-else selection statements are placed inside other if-else selection statements.
  - Whenever a condition returns true, rest of the statements are skipped.

## The if-else selection statement

- Compound statement is defined as a set of statements within a pair of braces
- Compound statements with declarations are defined as block.

```
if(a>10)
{
    cout<<"Your value is greater than 10\n";
    cout<<"Enter a new value \n";
}
```