ARDUINO™

CONTROL STATEMENTS

- Decision making structures require that the programmer specify one or more conditions to be evaluated or tested by the program.

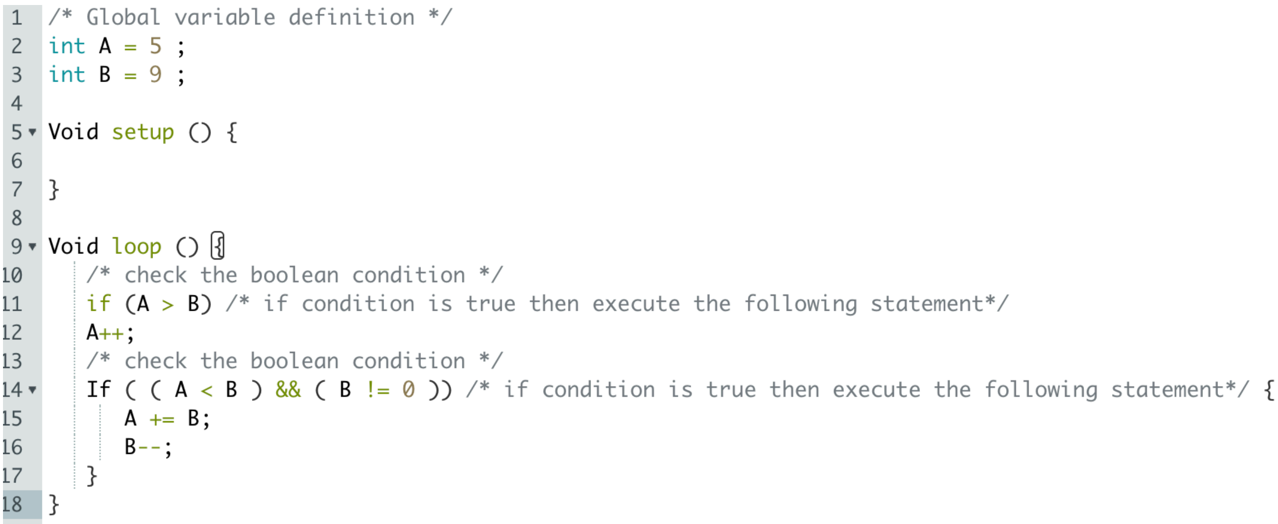
  — if statement
  — if … else statement
  — if … else if … else statement
  — switch case statement
  — conditional operator

- if statement
  It takes an expression in parenthesis and a statement or block of statements. If the expression is true then the statement or block of statements gets executed otherwise these statements are skipped.

Form 1
if (expression)
    statement;

Form 2
if (expression) {
    block of statements;
}

Example

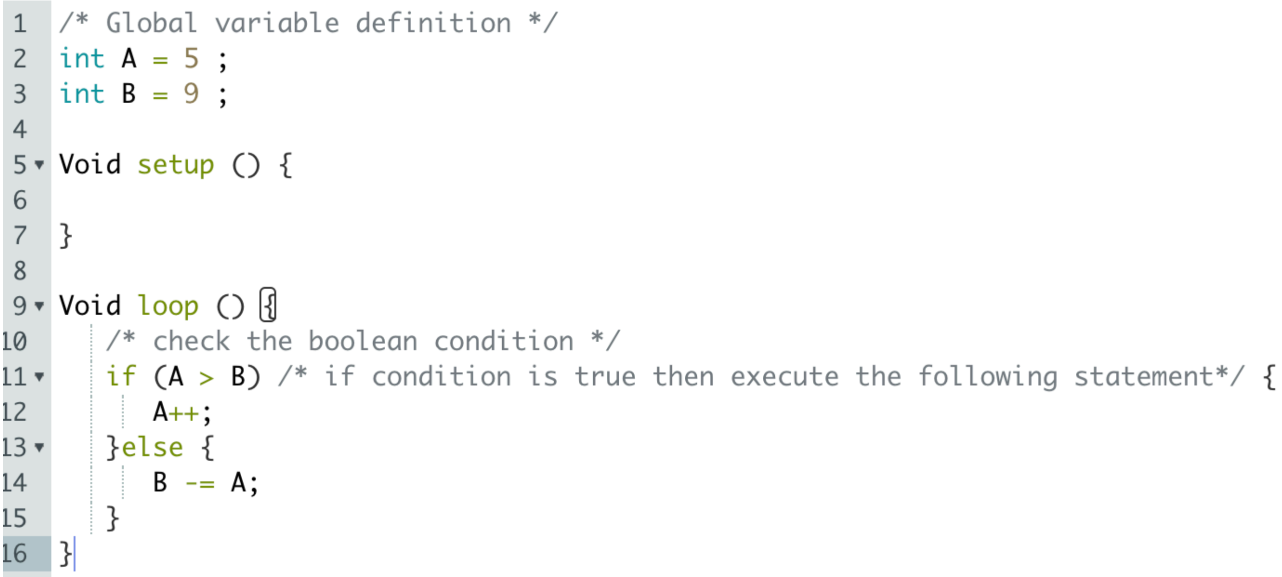


```
/* Global variable definition */
int A = 5 ;
int B = 9 ;

Void setup () {

}

Void loop () {
   /* check the boolean condition */
   if (A > B) /* if condition is true then execute the following statement*/
   A++;
   /* check the boolean condition */
   If ( ( A < B ) && ( B != 0 )) /* if condition is true then execute the following statement*/ {
      A += B;
      B--;
   }
}
```

- if…else statement

An **if** statement can be followed by an optional else statement, which executes when the expression is false.

```
if (expression) {
    Block of statements;
 }
 else {
    Block of statements;
 }
```

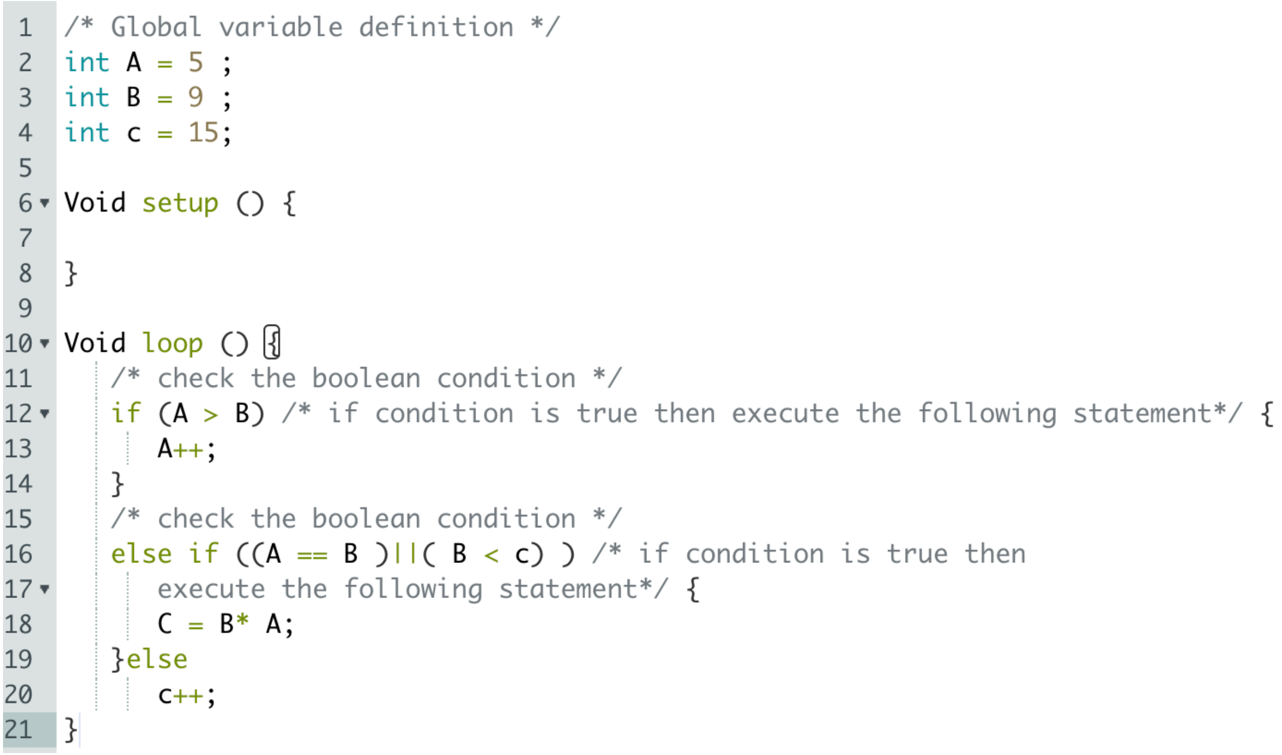


```
/* Global variable definition */
int A = 5 ;
int B = 9 ;

Void setup () {

}

Void loop () {
   /* check the boolean condition */
   if (A > B) /* if condition is true then execute the following statement*/ {
      A++;
   }else {
      B -= A;
   }
}
```

- if…else if…else statement

The **if** statement can be followed by an optional **else if...else** statement, which is very useful to test various conditions using single if...else if statement.
When using **if...else if…else** statements, keep in mind:
— An **if** can have zero or one else statement and it must come after any else if'
— An **if** can have zero to many else if statements and they must come before the else.'
— Once an **else if** succeeds, none of the remaining else if or else statements will be tested.

EXAMPLE



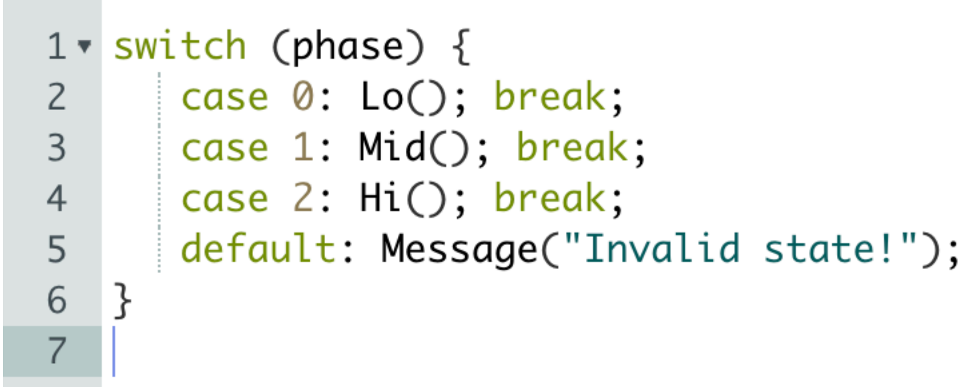
```
/* Global variable definition */
int A = 5 ;
int B = 9 ;
int c = 15;

Void setup () {

}

Void loop () {
    /* check the boolean condition */
    if (A > B) /* if condition is true then execute the following statement*/ {
        A++;
    }
    /* check the boolean condition */
    else if ((A == B )||( B < c) ) /* if condition is true then
        execute the following statement*/ {
        C = B* A;
    }else
        c++;
}
```

- switch case statement

  Similar to the if statements, **switch...case** controls the flow of programs by allowing the programmers to specify different codes that should be executed in various conditions. In particular, a **switch** statement compares the value of a variable to the values specified in the **case** statements. When a case statement is found whose value matches that of the variable, the code in that case statement is run.

  The **break** keyword makes the switch statement exit, and is typically used at the end of each case. Without a break statement, the switch statement will continue executing the following expressions ("falling-through") until a break, or the end of the switch statement is reached.

  EXAMPLE



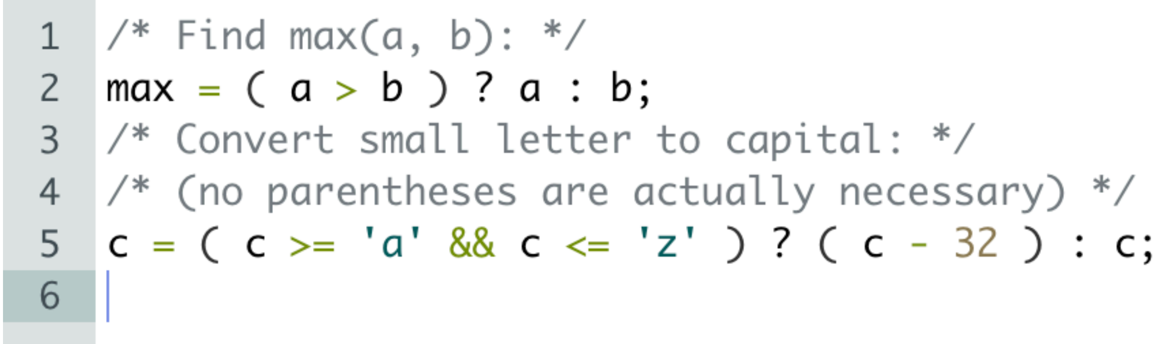
```
switch (phase) {
    case 0: Lo(); break;
    case 1: Mid(); break;
    case 2: Hi(); break;
    default: Message("Invalid state!");
}
```

- conditional operator ?:

expression1 ? expression2 : expression3

Expression1 is evaluated first. If its value is true, then expression2 is evaluated and expression3 is ignored. If expression1 is evaluated as false, then expression3 evaluates and expression2 is ignored. The result will be a value of either expression2 or expression3 depending upon which of them evaluates as True.
Conditional operator associates from right to left.

EXAMPLE



```
/* Find max(a, b): */
max = ( a > b ) ? a : b;
/* Convert small letter to capital: */
/* (no parentheses are actually necessary) */
c = ( c >= 'a' && c <= 'z' ) ? ( c - 32 ) : c;

```