Control Statements and Loops in Arduino

CSE- 315

Peripherals & Interfacing

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Control statements

Control statement:

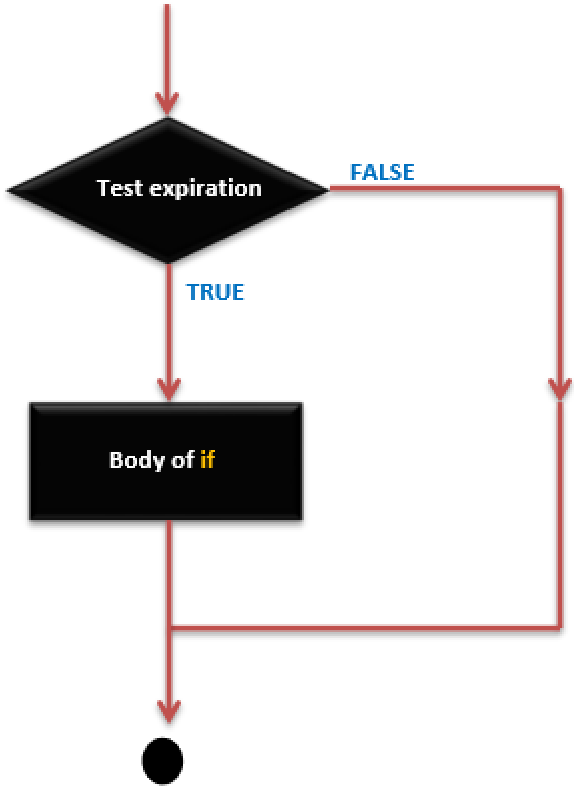
- If
- If…. else
- If….else if()….else
- Switch case
- Conditional Operator **?:**

If statement:

```
if (expression)
   statement;
```

OR,

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

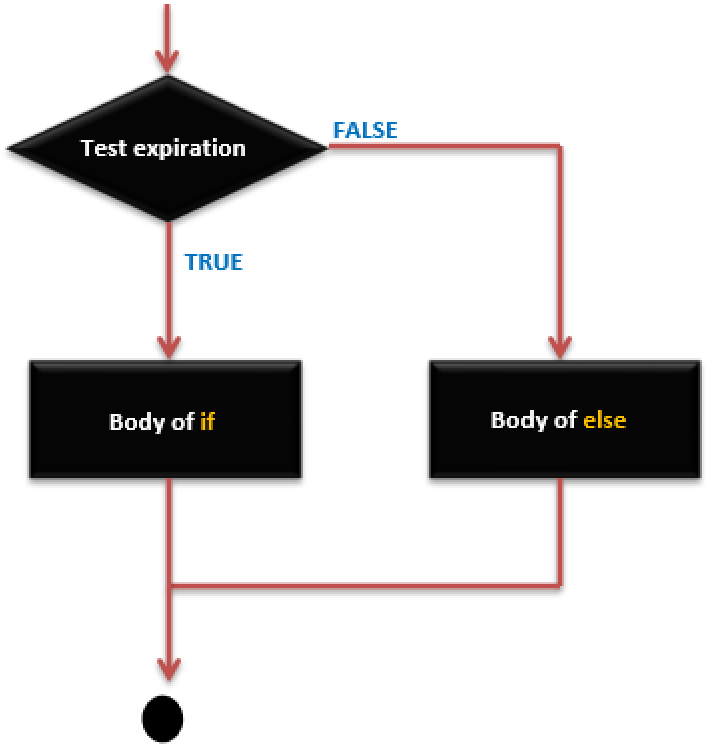


If statement: (contd.)

```
int A = 5 ; /* Global variable definition */
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:

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

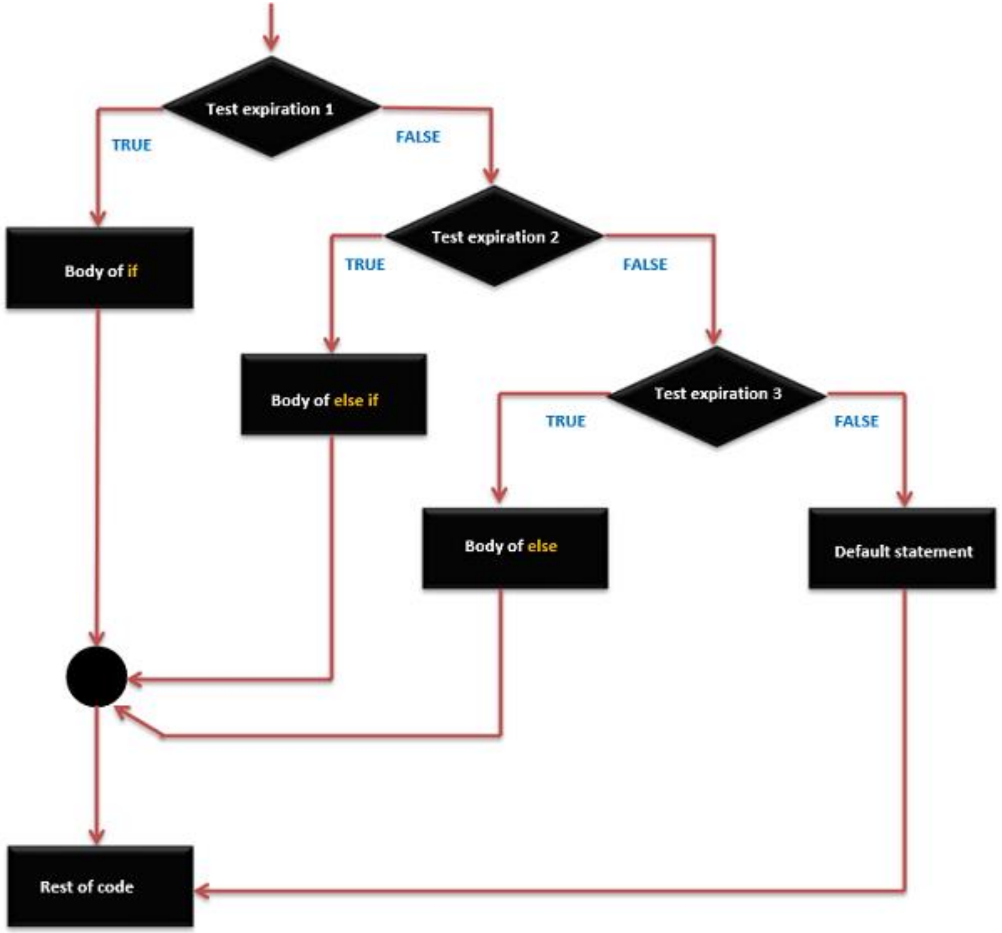


If… else statement: (contd.)

```
int A = 5 ;                  /* Global variable definition */
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:

```
if (expression_1) {
   Block of statements;
}

else if(expression_2) {
   Block of statements;
}
.
.
.

else {
   Block of statements;
}
```

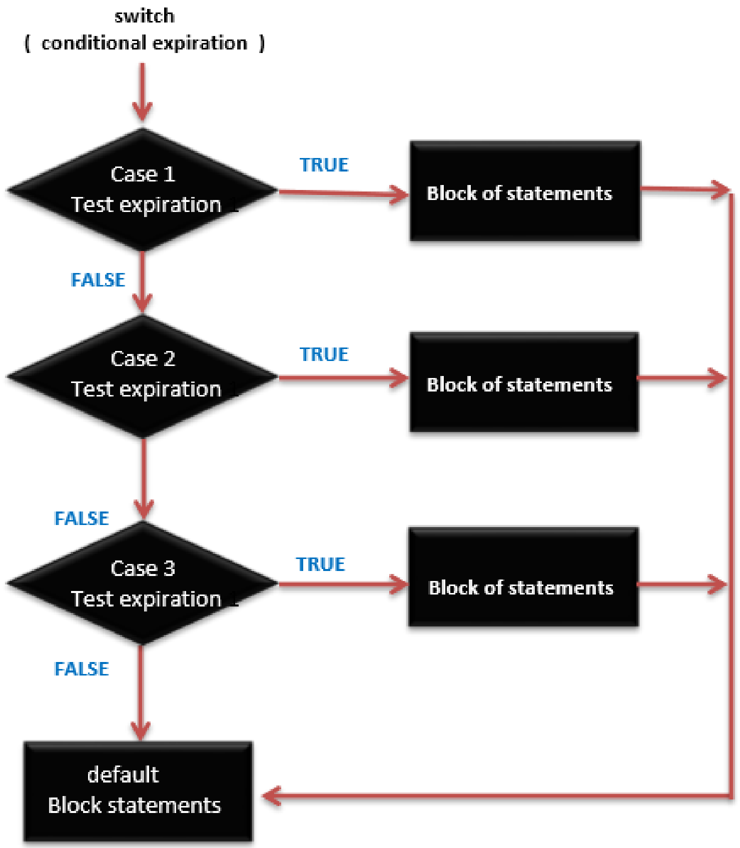


If..else If…. else statement: (contd.)

```
int A = 5 ;       /* Global variable definition */
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:

```
switch (variable) {
  case label:
  // statements
  break;
}

case label: {
  // statements
  break;
}

default: {
  // statements
  break;
}
```



Switch case statement: (contd.)

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

Conditional Operator:

expression1 ? expression2 : expression3

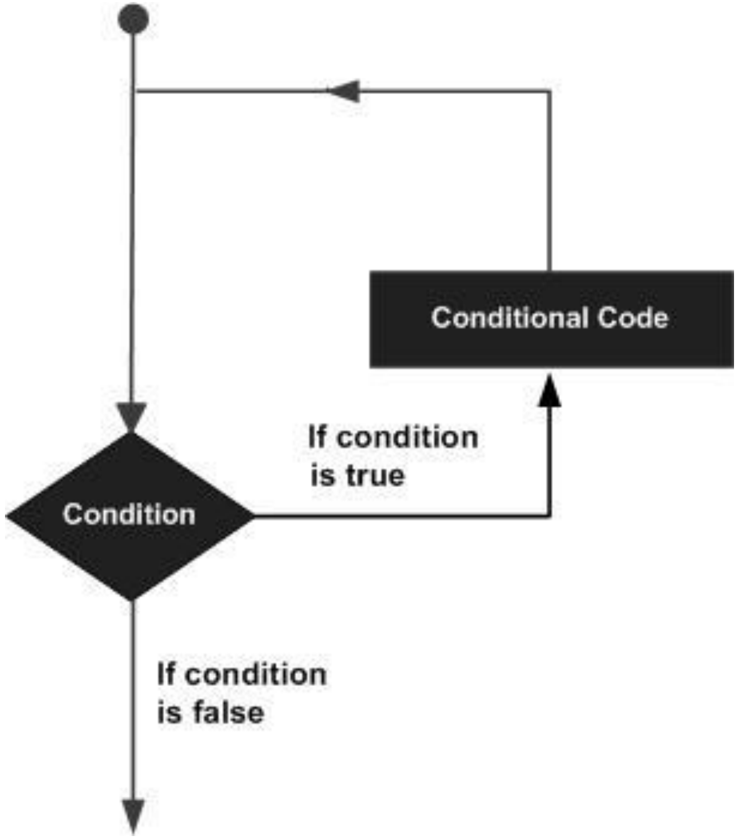
max = (a > b) ? a : b;

If the condition is true then a otherwise b.

Loops

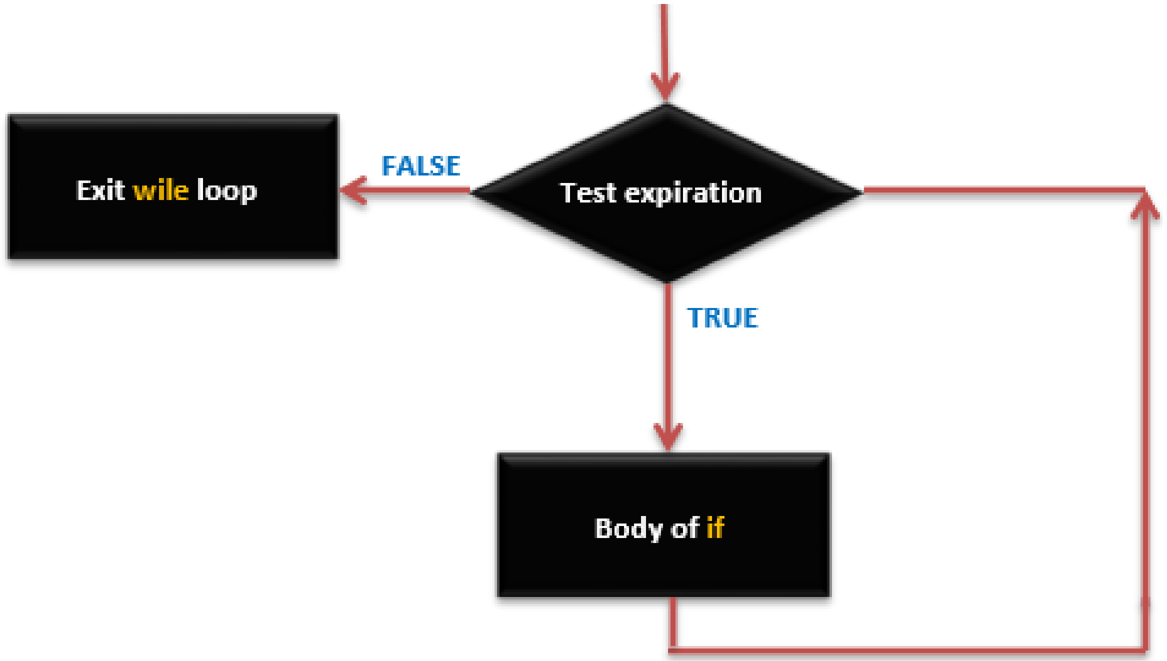
Loops:

- While
- Do…. While
- For
- Nested Loop
- Infinite Loop



While loop:

```
while(expression) {
   Block of statements;
}
```

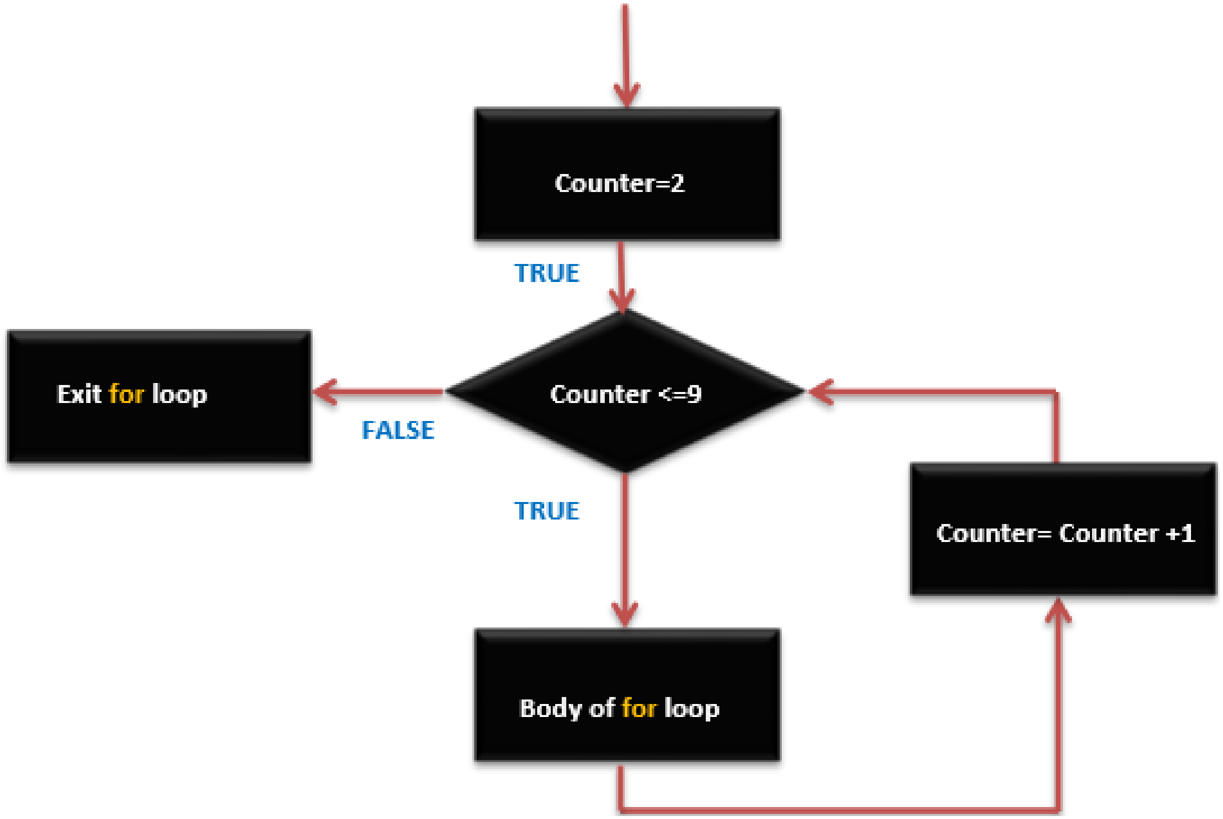


Do… While

```
do {
   Block of statements;
}
while (expression);
```

For loop:

```
for ( initialize; control; increment or decrement) {
   // statement block
}
```



Nested Loop:

```
for ( initialize ;control; increment or decrement) {
  // statement block
  for ( initialize ;control; increment or decrement) {
    // statement block
  }
}
```

Infinite Loop:

```
for (;;) {
   // statement block
}

while(1) {
   // statement block
}

do {
   Block of statements;
}
while(1);
```

analogWrite()

Syntax-

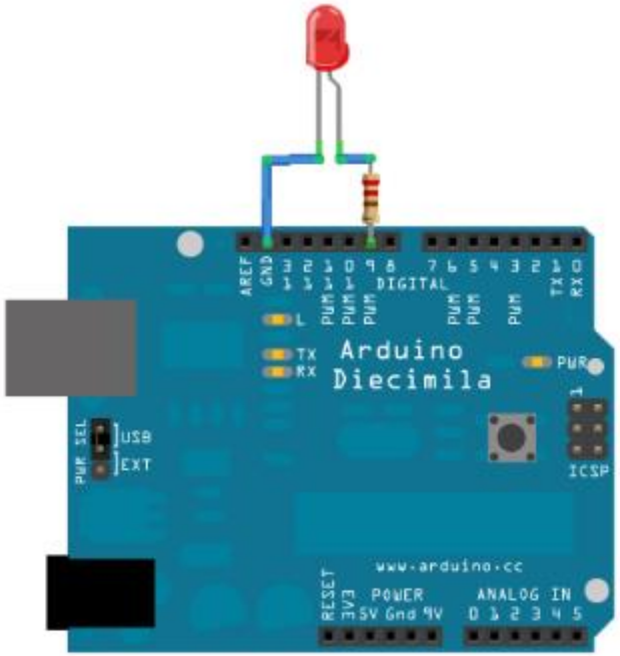
```
analogWrite(Pin Number, PWM value);
```

Fading a LED with analogWrite:

Hardware Required:

- Arduino or Genuino board
- LED
- 220 ohm resistor
- hook-up wires
- breadboard

Fading a LED with analogWrite: (Contd.)



Fading a LED with analogWrite: (Contd.)

```
int ledPin = 9;    // LED connected to digital pin 9

void setup() {
  // nothing happens in setup
}
```

Fading a LED with analogWrite: (Contd.)

```
void loop() {
 // fade in from min to max in increments of 5 points:
 for (int fadeValue = 0 ; fadeValue <= 255; fadeValue += 5) {
   // sets the value (range from 0 to 255):
   analogWrite(ledPin, fadeValue);
   // wait for 30 milliseconds to see the dimming effect
   delay(30);
 }
```

Fading a LED with analogWrite: (Contd.)

```
 // fade out from max to min in increments of 5 points:
 for (int fadeValue = 255 ; fadeValue >= 0; fadeValue -= 5) {
   // sets the value (range from 0 to 255):
   analogWrite(ledPin, fadeValue);
   // wait for 30 milliseconds to see the dimming effect
   delay(30);
 }
}
```

Fading a LED with analogWrite: (Contd.) [Loop code at once.]

```
void loop() {
  // fade in from min to max in increments of 5 points:
  for (int fadeValue = 0 ; fadeValue <= 255; fadeValue += 5) {
    // sets the value (range from 0 to 255):
    analogWrite(ledPin, fadeValue);
    // wait for 30 milliseconds to see the dimming effect
    delay(30);
  }

  // fade out from max to min in increments of 5 points:
  for (int fadeValue = 255 ; fadeValue >= 0; fadeValue -= 5) {
    // sets the value (range from 0 to 255):
    analogWrite(ledPin, fadeValue);
    // wait for 30 milliseconds to see the dimming effect
    delay(30);
  }
}
```

Thank You