CADT
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Cambodia Academy of Digital Technology

IDT
វិទ្យាស្ថានបច្ចេកវិទ្យាឌីជីថល
Institute of Digital Technology

Week 06

Control Statements – Iteration

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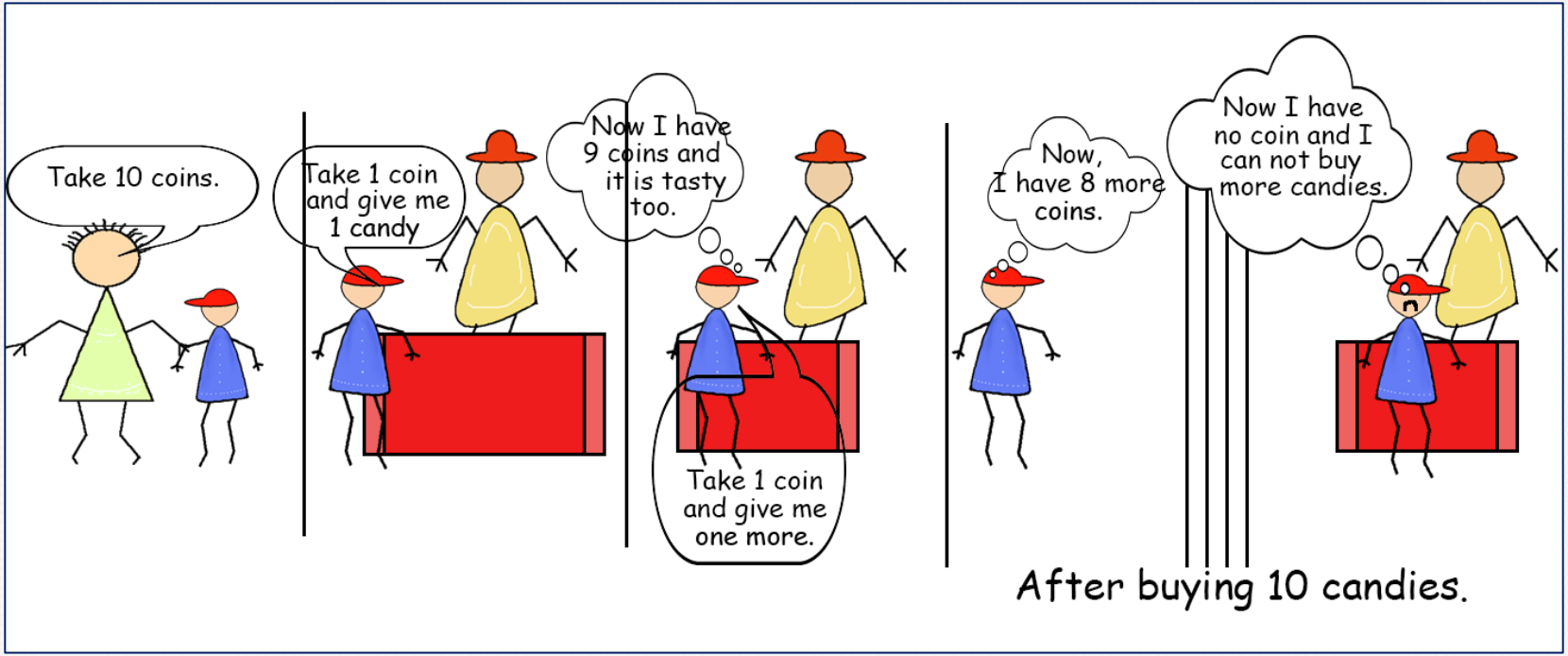
Last Time

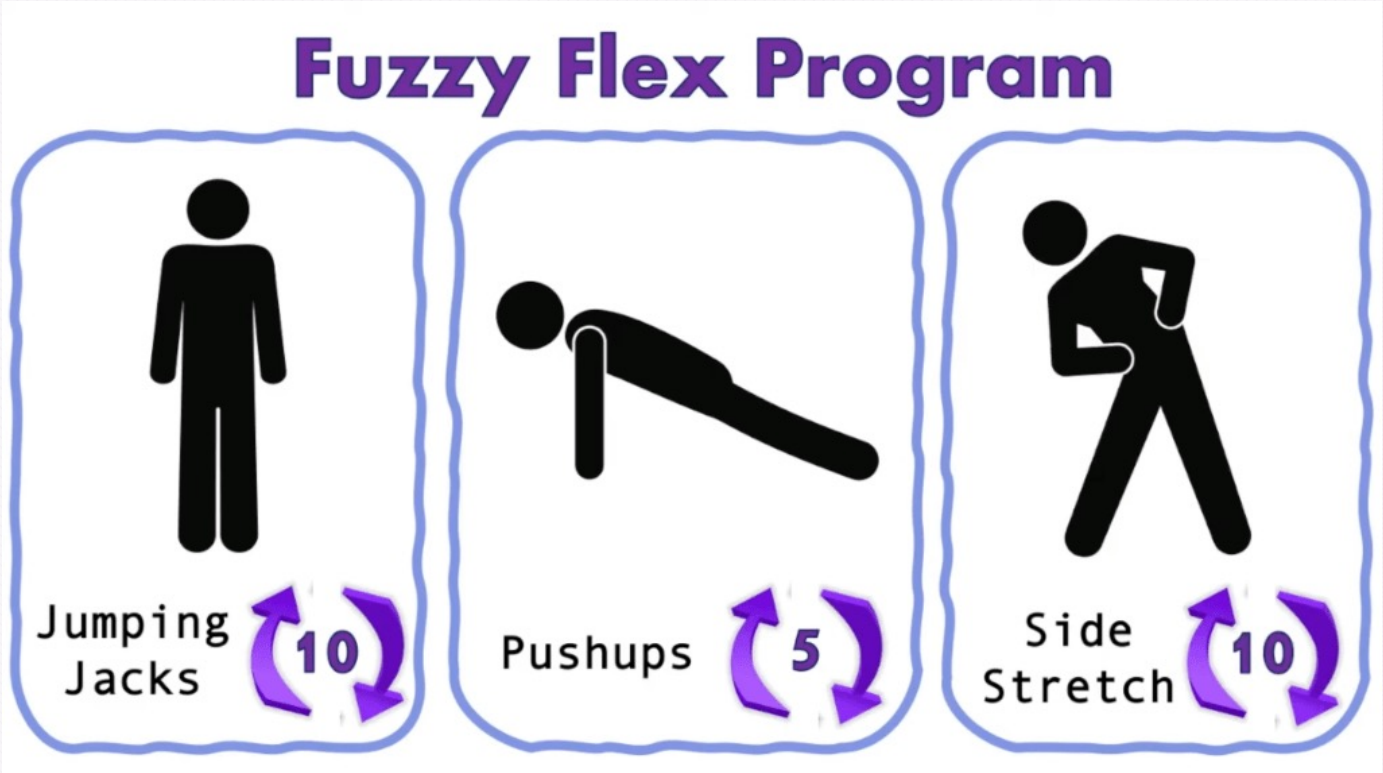
You have learned about:

- The definition of control statements and their programs.
- The implementation of selection statements, including if, if-else, ternary operator, else-if, and switch statements.

Let’s get started with this image!



Have a look with this activity!



How about this image?

Eating Chips

1. Reach down.
2. Grab a chip.
3. Put a chip in your mouth.
4. Repeat.

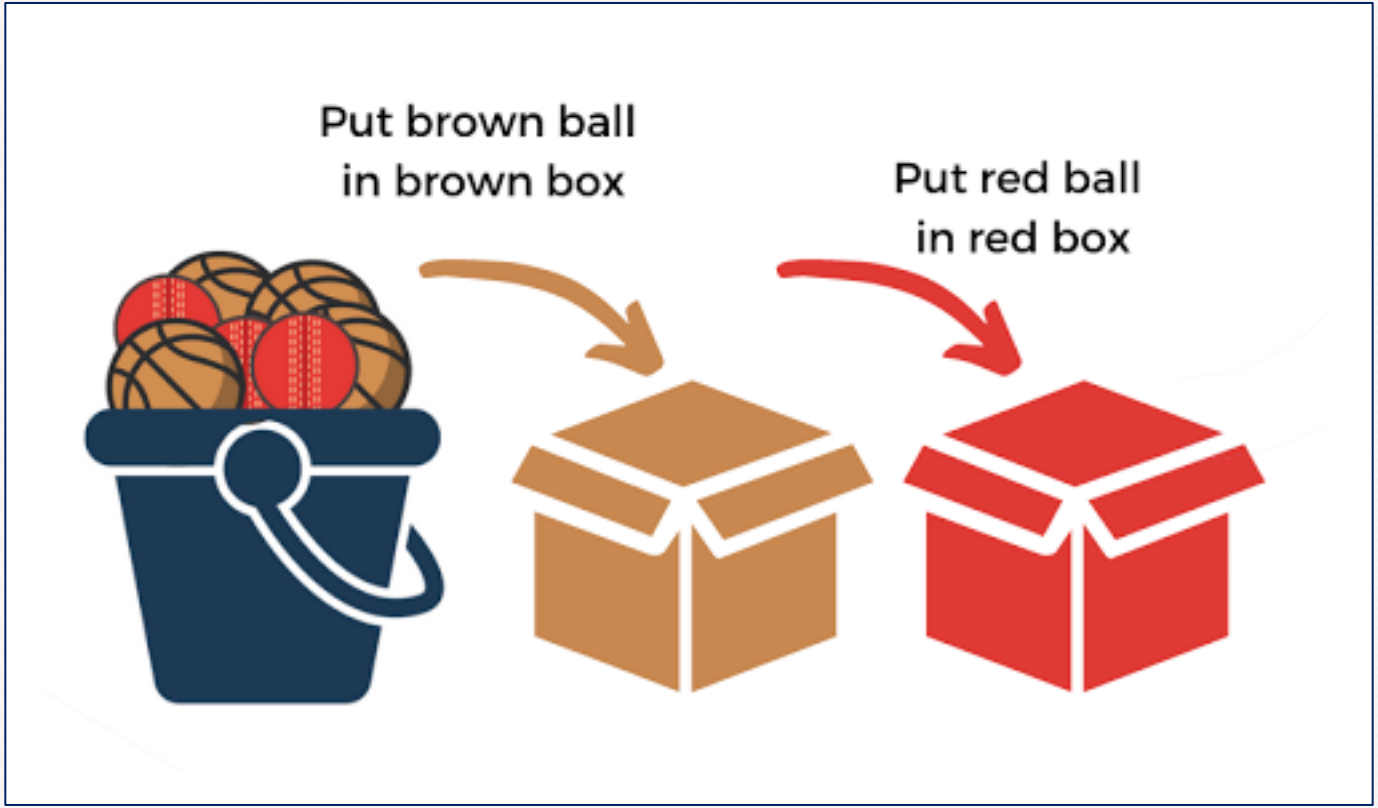
Playing Catch

1. Throw the ball.
2. Wait.
3. Catch the ball.
4. Repeat.

Folding Clothes

1. Pick a shirt up.
2. Fold it.
3. Put it in a pile.
4. Repeat.

Last Image!



Learning Objectives

By the end of this lesson, you will be to:

- ❑ Define iteration or loop.
- ❑ Identify the type of iteration.
- ❑ Utilize the while construct.
- ❑ Utilize the for construct.

Program Control Statements

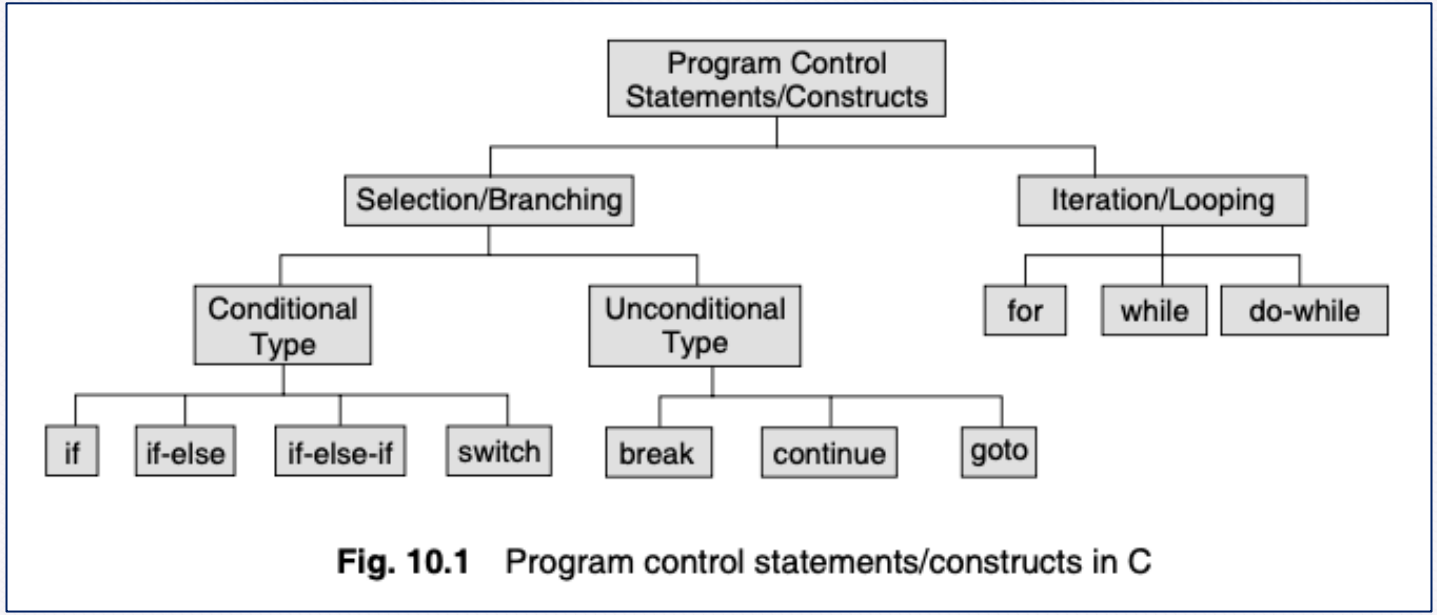


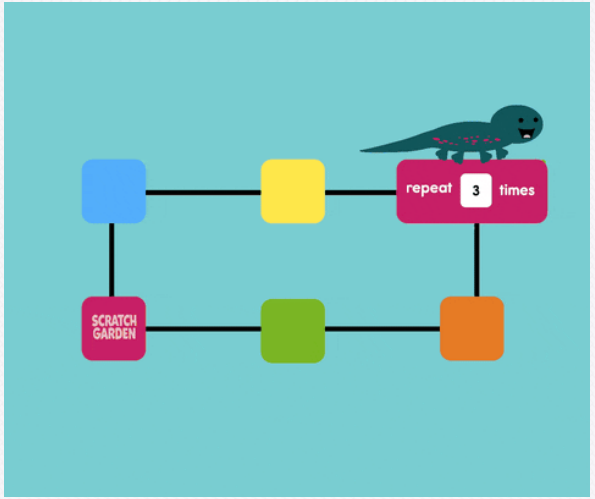
Fig. 10.1 Program control statements/constructs in C

Iteration/Looping

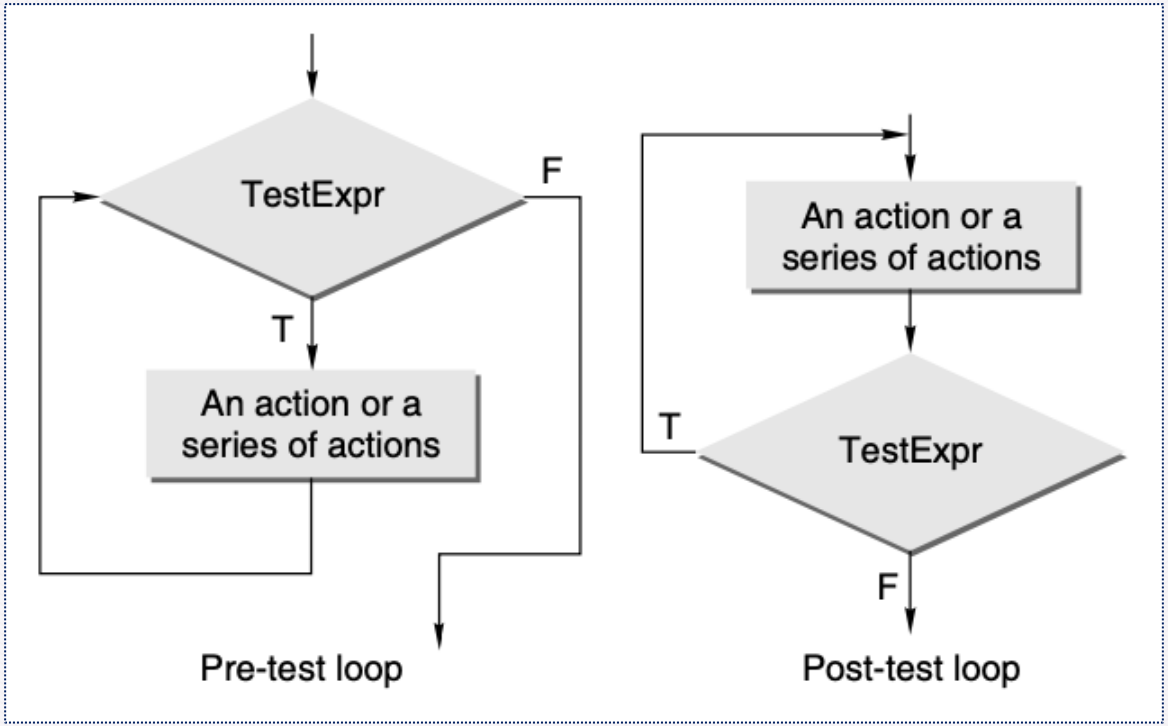
- **Iteration** is the process of doing something again and again.

  (Ref. Cambridge Dictionary)

- *A loop allows one to execute a statement or block of statements repeatedly.*



Loop variations



Types of iterations

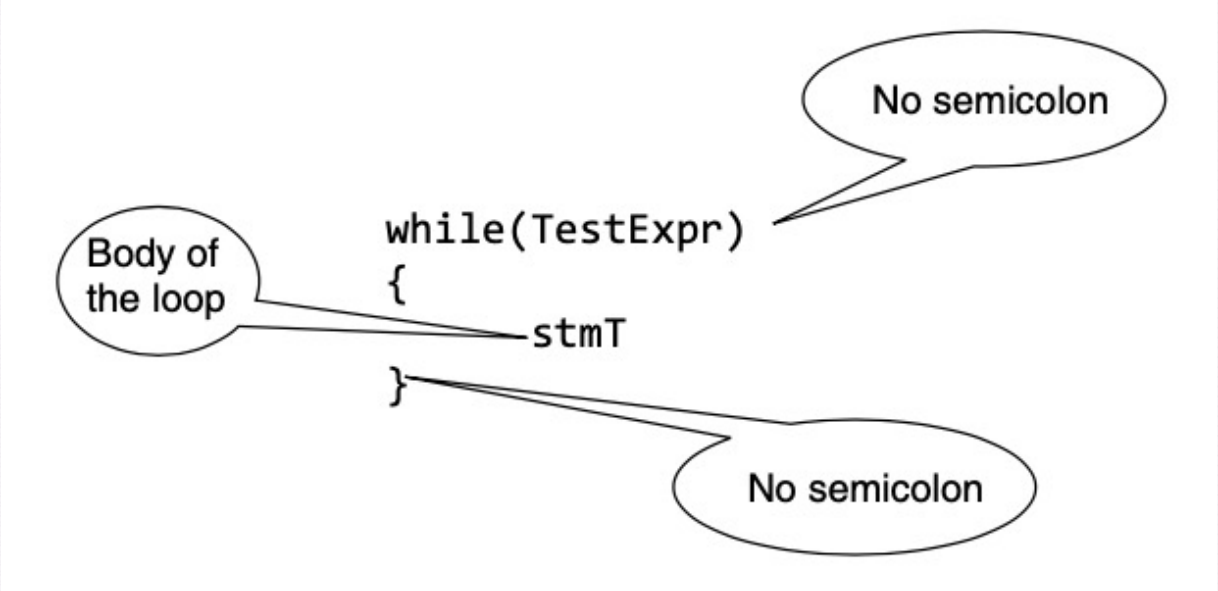
- There are mainly **two types** of iterations or loops:
  - **Bounded iteration/loop**
    - should be used when *we know, ahead of time, how many times we need to loop.*
    - C provides **for** construct as bounded loop.
  - **Unbounded iteration/loop**
    - should be used when *one does not know, ahead of time, how many iterations may be required.*
    - C provides two types of unbounded loops: **while** and **do...while** construct.

while Construct (1/3)

- **while** statement is a pre-test loop.
- It uses a test expression to control the loop. Since it is a pre-test loop, it evaluates the test expression before every iteration of the loop.

while Construct (2/3)

*Syntax of the **while** statement*



while Construct (3/3)

Example:

```
int a = 1;
while ( a < 4 )
{
printf ( "Hello World\n" );
a ++;
}
```

Output

codesdope.com

Self-study

do-while Construct

- What is it? How to use this construct?
- What is the syntax? Please provide one/two examples.

for Construct (1/3)

- A loop formed by using the **for** statement is generally called *a determinate or definite loop* because the programmer knows exactly how many times it will repeat.
- *The number of repetitions can be determined mathematically by manually checking the logic of the loop.*

for Construct (2/3)

*Syntax of the **for** statement*

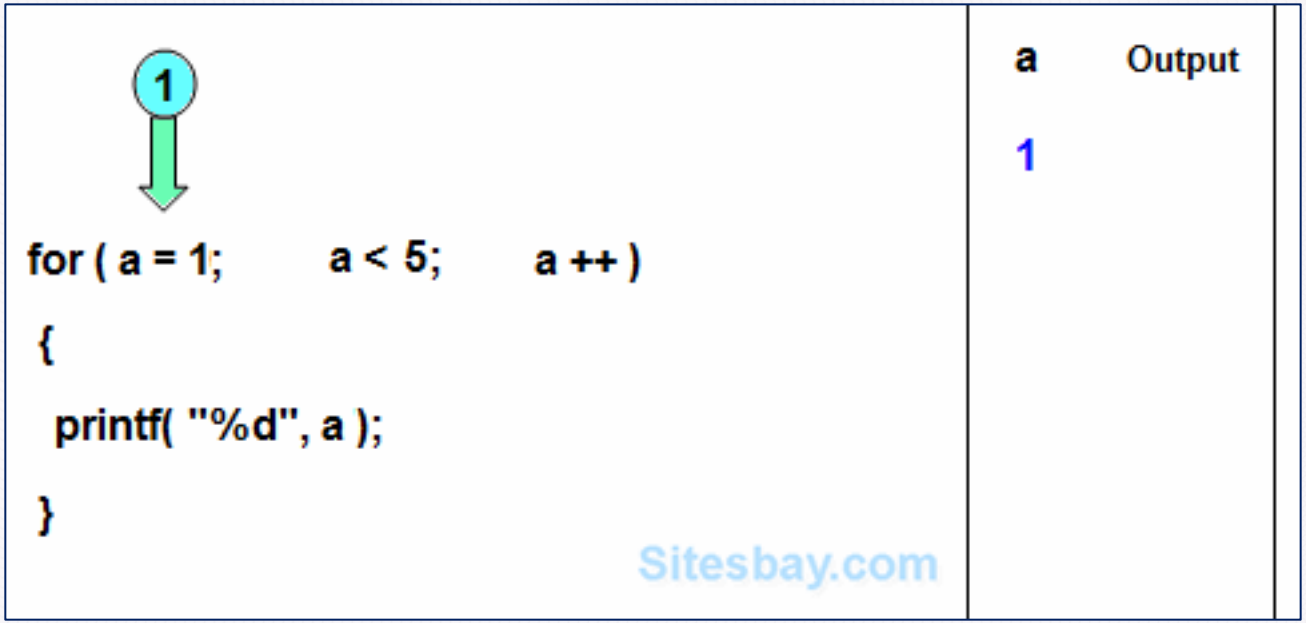
```
for(initialization; TestExpr; updating)
{
        stmT;
}
```

where:

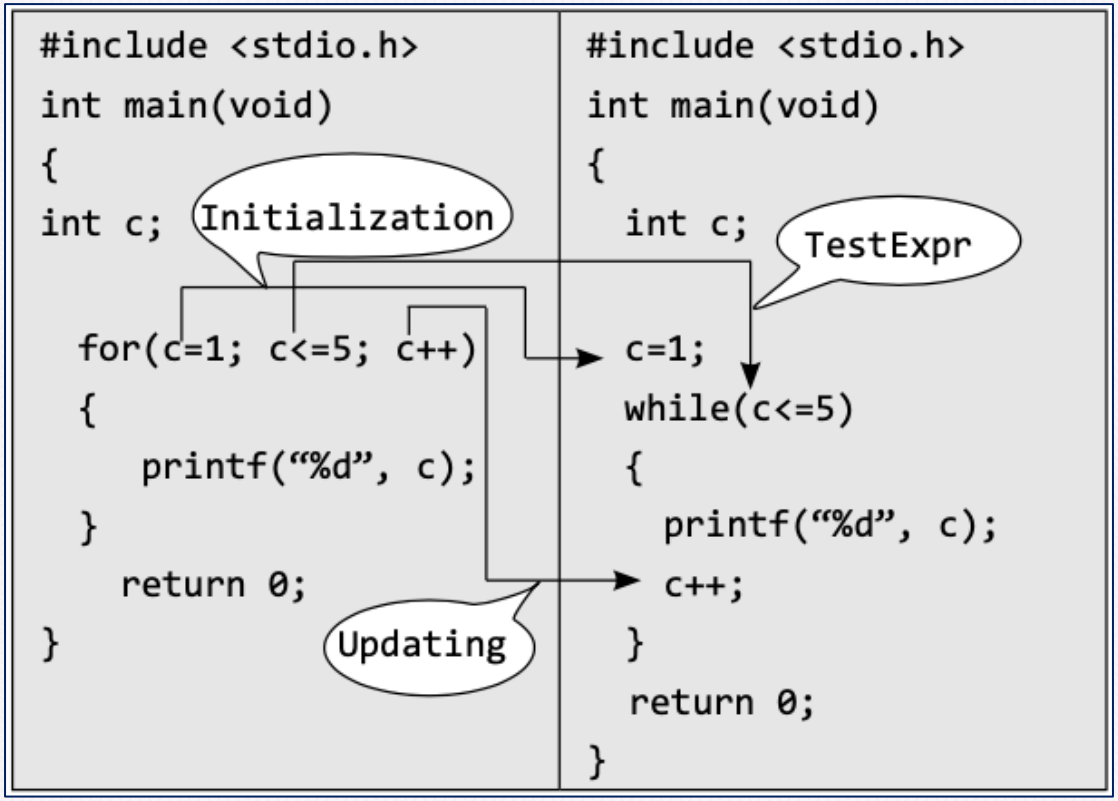
- **Initialization**: This part of the loop is the first to be executed. The statement(s) of this part are executed only once. This statement involves a loop control variable.
- **TestExpr**: TestExpr represents a test expression that must be true for the loop to continue execution.
- **stmT:** stmT is a single or block of statements.

for Construct (3/3)

Example:



while vs for


#include <stdio.h>
int main(void)
{
int c;
for(c=1; c<=5; c++)
{
printf("%d", c);
}
return 0;
}
Initialization
Updating
#include <stdio.h>
int main(void)
{
int c;
c=1;
while(c<=5)
{
printf("%d", c);
c++;
}
return 0;
}
TestExpr

Self-study

Must be able to use unconditional type, including:

- **break**
- **continue**
- **goto**

Self-study

- What is a Nested loop and how to use it?
- What are the similarities and differences between while and for?
- What are the differences between while and do-while?
- Can you provide some real-life examples from the lesson today?

Key Takeaways

You are now able to:

- ✓ Define iteration or loop.
- ✓ Identify the type of iteration.
- ✓ Utilize the while construct.
- ✓ Utilize the for construct.

Reference

- Dey, P., & Ghosh, M. (2013). *Computer fundamentals and programming in C*.

Thank you !

Questions or Feedbacks?

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