Review

- Variables and Operators
  - Variables: Identifiers, Data type, Scope, Initializer.
  - Operators: Assignment, Arithmetic / Bitwise / Logical operators, etc.
  - Memory in C

Control Structures in C – Condition

Lecture 27-1

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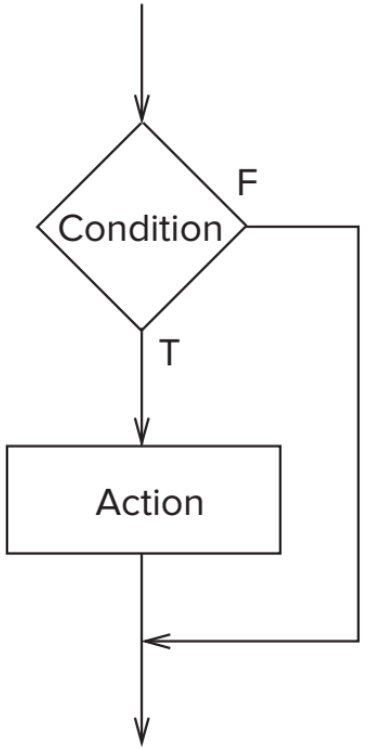
If Statement

- For a block of one statement
  - **if** (<condition>)
  - <one statement block>

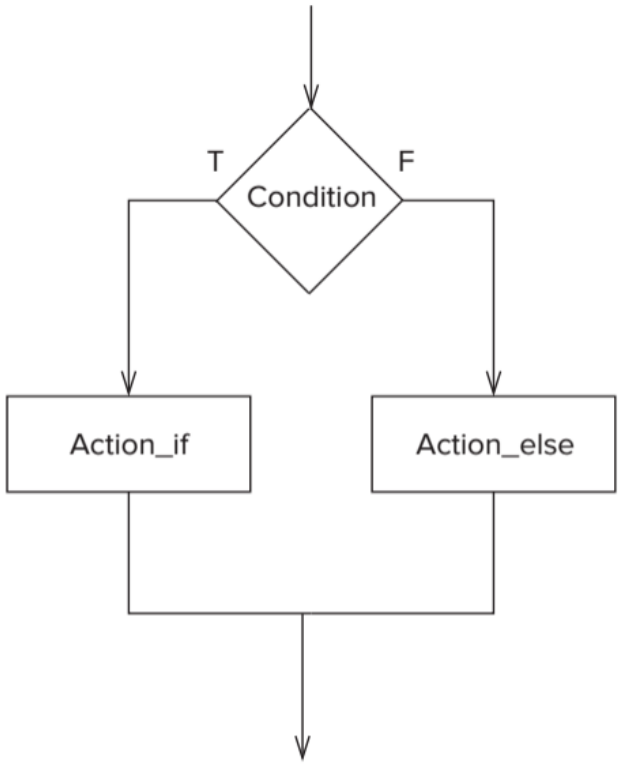
- For a block of multiple statements
  - **if** (<condition>) {
  - <statement 1>
  - <statement 2>
  - ….
  - }



If-Else Statement

- For a block of one statement
  - if (<condition>)
  - <one statement block>
  - else
  - <one statement block>

- For a block of multiple statements
  - **if** (<condition>) {
  - <multi-statement block>
  - }
  - **else** {
  - <multi-statement block>
  - }



If-Else Statement

- Example (Let's do it together)

```
#include <stdio.h>

int main(void){
    int month;
    printf("Enter the number of the month: ");
    scanf("%d", &month);

    if (month == 4 || mont == 6 || month == 9 || month == 11)
        printf("The month has 30 days\n");
    else if (month == 1 || month == 3 || month == 5 ||
             month ==7 ||month == 8 || month == 10 || month == 12)
        printf("The month has 31 days\n");
    else
        printf("Don't know that month\n");
}
```

If-Else Statement

- An **else** is associated with the closest unassociated **if**
  - **if** (x != 10)
  - **if** (y > 3)
  - z = z / 2;
  - **else**
  - z * 2;
- To not be confused, it is better to **clarify** the associativity by using **parentheses**
  - **if** (x != 10) {
  - **if** (y > 3)
  - z = z / 2;
  - }
  - **else** {
  - z = z * 2;
  - }

Switch Statement

- Similar to multiple if-else statements but uses "**case**"
  - Important to include **break;** at the end of each case
    - Case is only a starting point of execution, not the end of it
    - Without break, all the remaining codes in the switch statement will be executed
- **default** case can be optionally included
  - Executed when no case matches the switch expression

```
switch (keyPress) {
case 'a':
   // Do statement A
   break;

case 'b':
   // Do statement B
   break;

case 'x':
   // Do statement C
   break;

case 'y':
   // Do statement D
   break;
}
```

Control Structures in C – Iteration

Lecture 27-2

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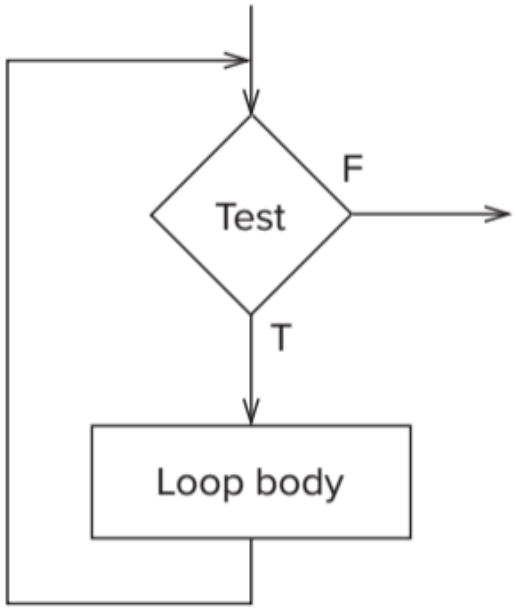
While Statement

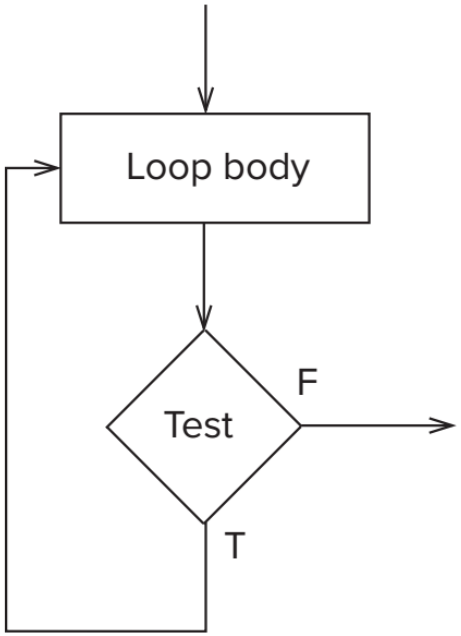
- **while (<test>) {**
- **   <loop body>**
- }

- Example
  - #include <stdio.h>
  - int main(void) {
  -     int x = 0;
  -     **while** (x < 10) {
  -         printf("%d ", x);
  -         x += 1;
  -     }
  - }



Do-While Statement

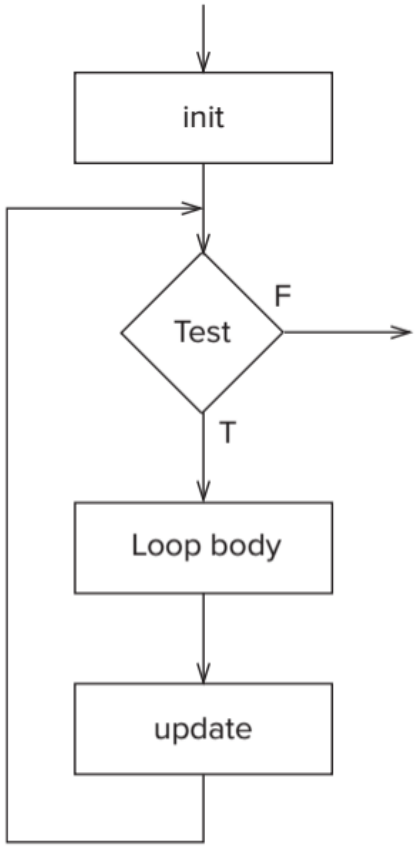
- **do** {
- <**loop body**>
- } **while** (<**test**>);
  - Action is performed first and then the condition is evaluated whether to continue
- Example
  - #include <stdio.h>
  - int main(void) {
  - int x = 0;
  - **do** {
  - printf(“%d ”, x);
  - x += 1;
  - } **while** (x < 10);
  - }



For Statement

- For (**initialization**; **test**; **update**) {
- <**loop body**>
- }

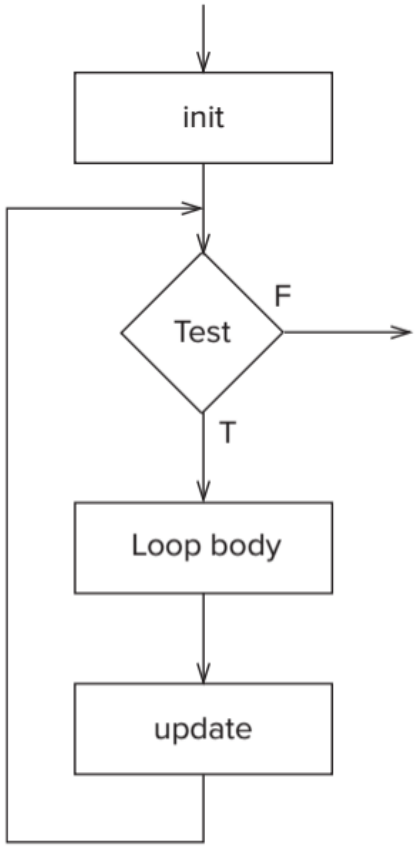
- Example
  - #include <stdio.h>
  - int main(void) {
  - int x;
  - **for** (x = 0; x < 10; x++) {
  - printf("%d ", x);
  - }
  - }



For Statement

- Initialization part can be a **declaration**
  - Then, the declared variable's scope is the for statement itself (self contained!)

- Example
  - #include <stdio.h>
  - int main(void) {
  - **for** (int x = 0; x < 10; x++) {
  - printf("%d ", x);
  - }
  - }



For Statement

- **Nested Loops** are also provided in C
  - Then, the declared variable's scope is the for statement itself (self contained!)

- Example
  - #include <stdio.h>
  - int main(void) {
  - **for** (int multiplicand = 0; multiplicand < 10; multiplicand++) {
  - **for** (int multiplier = 0; multiplier < 10; multiplier++) {
  - printf("%d\t ", multiplier * multiplicand);
  - }
  - printf("\n");
  - }
  - }

Break and Continue Statements

- **break;** exits a loop or a switch statement right away

```
// This code segment produces the output: 0 1 2 3 4
for (i = 0; i < 10; i++) {
   if (i==5)
      break;
   printf("%d ", i);
}
```

- **continue;** causes only the current iteration to end

```
// This code produces the output: 0 1 2 3 4 6 7 8 9
for (i = 0; i < 10; i++) {
   if (i==5)
      continue;
   printf("%d ", i);
}
```

Summary

- Conditional Constructs
  - If Statement
  - If-Else Statement

- Iteration Constructs
  - While Statement
  - Do-While Statement
  - For Statement
  - Break and Continue Statements
  - Switch Statement

Thanks!