

DECISION MAKING AND BRANCHING

CHAPTER - 7

Control or Decision structures

Control statements are used to transfer the control from one part of the program to another.

- (i) if() statement
- (ii) Switch statement
- (iii) Ternary operator
- (iv) goto statement

If() statement

- It is used to carry out a logical test of the condition and take one of the possible actions depending on the result of the test. (i.e whether the condition is true or false).

The syntax is

```
If (condition)
```

```
{
```

```
S1;
```

```
S2;
```

If-else statement

- This provides two way branching. The general form of if-else is:

```
if (condition)
```

```
  s1;
```

```
else
```

```
  s2;
```

```
  s3;
```

Nested if() statement

- One if statement is included in another if statement. Such statements are called nested if statement.

```
if (cond)
```

```
    if (cond)
```

```
        s1;
```

```
    else
```

```
        s2;
```

```
else
```

Example for Nested if statement

```
If ( (hrs >=17) && (hrs <21) )
```

```
    printf(" Good evening");
```

The ELSE-IF ladder

- Another way of describing nested if()-else is the else-if ladder where every else is associated with an if() statement

- The general form of else-if ladder is

```
if (cond1)
```

```
    statement-1;
```

```
else if (cond2)
```

```
    statement-2;
```

```
else if (cond3)
```

```
    statement-3;
```

```
-----
```

```
-----
```

```
else
```

- Example for else if ladder

```
if (marks >=0 && marks <40)
```

```
    grade = 'F';
```

```
else if (marks <50)
```

```
    grade = 'D';
```

```
else if (marks <60)
```

```
    grade = 'C';
```

```
else if (marks < 75)
```

```
    grade='B';
```

```
else if (marks <=100)
```

SWITCH-CASE-DEFAULT STATEMENT

- The switch-case-default statement is useful whenever flow of control must be directed to one of the several possible statements.

- The general syntax of switch statement is

Switch(variable or expression)

{

case value1: st-1;

break;

case value2: st-2;

break;

·

·

case value n : sn;

```
switch(day)
{
Case 1 : printf("Monday");
        break;
Case 2: printf("Tuesday");
        break;
Case 3: printf("Wednesday");
        break;
-----
Default : printf("wrong input");
```

goto statement

- Goto statement is used to transfer the control unconditionally to another part of the program which is marked by a label.
- The syntax is
 goto label;
label is an identifier.

- E-x

goto label;

-

-

-

label : statement-n;

Chapter – 8 Decision making and looping

- A looping structure is one ,where a sequence of statements are executed repeatedly until some condition for termination of the loop is satisfied.
- A loop consists of two parts
 - 1) Body of the loop
 - Set of statements
 - 2) Control statement.
 - It checks the condition

- The types of loops

- 1) Entry-controlled loops

The loops in which the control condition is tested at the beginning of the loop.

- 2) Exit –controlled loops

The loops in which the control condition is tested at the end of loop.

While() statement

- While() structure is an entry-controlled structure. Its syntax is

```
while(condition)
```

```
{
```

```
Statements;
```

```
-----
```

```
-----
```

```
}
```

- The condition is checked first. If the condition is found to be true, the set of statements are executed and control transferred back to the condition.
- The body of the loop is executed repeatedly, as long as the condition is true.
- The control is transferred to the next statement outside the loop, when the condition becomes false.

Program to print the numbers 1

```
/* program to print 1 to 100  
numbers */
```

```
#include <stdio.h>
```

```
void main()
```

```
{
```

```
int i,n;
```

```
i=1;
```

do..while statement

- The do..while() statement is an exit-controlled structure. Its general form is

do

{

statements;

}

- In the do. While structure, the body of the loop is evaluated first.
- The test condition is checked next. If the condition is true, control is transferred back to the beginning of the loop.
- When the condition is false, control is transferred to the next statement outside the loop.

example

```
i=1;
```

```
do
```

```
{
```

```
printf(“%d”,i);
```

```
i++;
```

```
}
```

```
while(i <=100);
```

Difference between while() and do.while() statement

While()	Do..while()
The condition is tested at the beginning of the loop	The condition is tested at the end of the loop
It is an Entry-controlled loop	It is an Exit-controlled loop
The while() loop operates as long as the condition is true.	The do. While() loop operates as long as condition is true.
The while() loop may not be executed at least once if the condition is false.	The do. While() loop is executed at least once if the condition is false

For statement

- The For statement is one of the most popular looping structure. It is an entry-controlled loop. The general form is

```
for (first-exp;second-exp;third-exp)
```

```
{
```

```
statements;
```

```
-----
```

```
-----
```

```
}
```

- The first expression is an assignment expression used to initialize the loop index or counter.
- Next, the second-expression which is the test condition, is checked. The loop is entered only if the condition is true, otherwise the control is transferred to the next statement.
- The third index is an assignment statement used to increment or decrement the loop index.

Example to print the numbers from 1 to 100

```
for(i=1;i<=10;i++)
```

```
printf("%d",i);
```

Continue statement

- Continue statement is used to skip the remaining statements in the loop and execution proceeds directly to the next iteration of the loop. Its general form is

`continue;`

```
while(condition)
```

```
{
```

```
-----
```

```
-----
```

```
if(condition)
```

```
continue;
```

```
-----
```

```
-----
```

Difference between break and continue

Break	Continue
It is used to exit from a loop	It is used to proceed to the next iteration of the loop
It is used in switch statement	It cannot be used in switch statement
General form is break;	General form is continue;

Exit() function

- This function is used to terminate a program immediately. its general form is

```
exit();
```

Assignment questions

1. Explain the scanf() function with example
2. Explain the printf() function with example.
3. Explain the four forms of if statement with example and flowchart.(simple if, If..else , Nested if, else..if ladder)
4. Explain switch statement with example and flowchart.
5. Explain conditional operator with

7. Explain while statement with example and flowchart.

8. Explain for statement with example and flowchart.

9. Explain do.while statement with example and flowchart.

10. Explain the difference between the following statements

(i) while and do.while

(ii) break and continue