CONTROL STATEMENTS: CONDITIONAL STATEMENTS

- Introduction, conditional execution (if, if-else, nested if), and selection (switch), unconditional types (break, continue, goto).

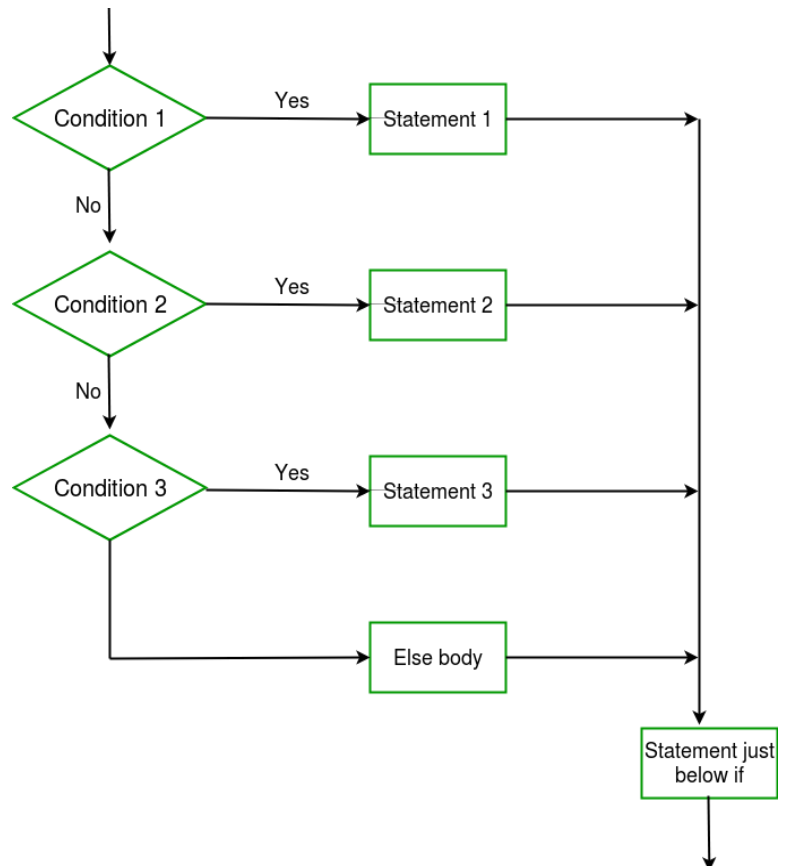### else if ladder / cascaded if else

⮞ It is used to execute one set of condition out of many set of conditions with its statements set.

Syntax: **Flowchart:**

```
        Statement 1;
        Statement 2;
if(condition 1)
{
     Statement 3;
}
else if(condition 2)
{
     Statement 4;
}
else if(condition 3)
{
     Statement 5;
}
else
{
     Statement 6;
}
     Statement 7;
```


Explanation

⮞ The keyword if and else must be followed by an expression and expression must be enclosed within parentheses.

⮞ First statement1 is executed followed by statement2.

⮞ Then Condition 1 is checked

  ✓ if true control goes to Statement3 and automatically goes to Statement7.

⮞ If false Condition 2 is checked

  ✓ If Condition 2 is true control goes to Statement4 and automatically goes to Statement7.

⮱ If false Condition 3 is checked

    ✓ If Condition 3 is true control goes to Statement5 and automatically goes to Statement7

⮱ If false Statement6 and automatically goes to Statement 7.

    Note: Write Algorithm, Flowchart and C Program for the following:

        ❖ To check an alphabet is vowel or consonant.

        ❖ To illustrate the simple calculator operations with condition for division operation.

    An Example which illustrates else if ladder control statement:

        1) To find biggest of three numbers.   2) Grading based on marks

Algorithm	Flowchart	Program

Algorithm: To find largest of 3 no
S1: Start
S2: Read a,b,c
S3: if(a>b && a>c)
    {
     Print "a largest"
    }
  else if(b>a && b>c)
    {
     Print "b largest"
    }
  else
    {
     Print "c largest"
    }
S4: Stop
	Draw the flowchart by yourself.	```c
		#include<stdio.h>
		void main()
		{
		inta,b,c;
		clrscr();
		printf(" Enter the 3 numbers\n")
		scanf("%d%d%d",&a,&b,&c);
		if(a>b && a>c)
		    {
		printf("a largest");
		    }
		else if(b>a && b>c)
		    {
		printf("b largest");
		    }
		 else
		    {
		printf("c largest");
		    }
		getch();
		}```

Algorithm: Grading based on marks
S1: Start
S2: Read marks
S3: if (marks >= 80)
   grade = 'A';
else if (marks >= 65)
   grade = 'B';
else if (marks >= 50)
   grade = 'C';
	Draw the flowchart by yourself.	```c
		#include<stdio.h>
		void main()
		{
		int marks;
		printf(" Enter the marks/n");
		if (marks >= 80)
		printf("grade = 'A' ");
		else if (marks >= 65)
		printf("grade = 'B' ");
		else if (marks >= 50)```

else		printf("grade = 'C' ");
grade = 'D';		else
S4: Stop		printf("grade = D ");
		getch();
		}

Switch statement

➲ Switch statements are used in following scenarios

  ✓ When a decision has to be made between many alternative cases.
  ✓ When the selection condition reduces to an integer value.
  ✓ The multiple selection mechanism is implemented using *switch*.
  ✓ *switch* is alternative for two way selection multiple *if-else-if*.

Syntax:

```
switch(an integer value)
{
case value1:Statement1;
        break;
case value2:Statement2;
break;
case value3:  Statement3;
break;
default:Statement4;
            break;
}
```

Flowchart:
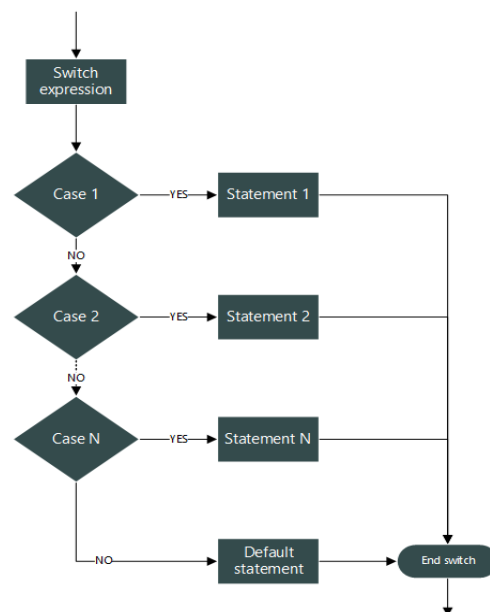
Explanation

➲ The switch statement is a multi-way decision that tests whether an expression matches one of a number of constant integer values / cases and branches accordingly.

➲ Each case is labelled by one or more integer-valued constants orconstant expressions.

➲ If a case matches the expression value, execution starts at that case.

➲ All case expressions must be different.

➲ The case labelled default is executed if none of the other cases are satisfied.

➲ A default is optional; if it isn't there and if none of the cases match, no action takes place. Cases and the default clause can occur in any order.

➲ The break statement causes an immediate exit from the switch.

More about switch statement:

➲ The expression of a switch statement must result in an integral type, meaning an integer (byte, short, int, long) or a char.

➲ The expression cannot be a boolean value or a floating point value (float or double)

➲ No two case labels can have the same constant value.

An Example which illustrates switch control statement:

Program to simulate a simple calculator that performs athematic operations only on integers. Error message should be reported if any attempt is made to divide by 0.

Algorithm	Program

Algorithm: Simple calculator
S1: Start
S2: Read a,b.
S3: switch(choice)
    {
Case '+':res = a+ b;
Output res;
    break;
Case '-':res = a- b;
Output res;
break;
Case '*': res = a-*b;
Output res;
break;
Case '/':if(b==0)
      {
"Divided by 0 error"
      }
    else
      {
res = a/b;
Output res;
    break;
    }
 	
default:output "invalid op"
    }
 	
S4: Stop
	`#include<stdio.h>`
	`void main()`
	`{`
	`int a,b,res;`
	`char choice;`
	`printf(" Enter your choice\n");`
	`scanf("%c",&choice);`
	`printf(" Enter the values of a &b\n");`
	`scanf("%d%d",&a,&b,);`
	`switch(choice)`
	`    {`
	`    case '+':   res = a+ b;`
	`                printf("%d", res);`
	`                break;`
	`    case '-':   res = a- b;`
	`                printf("%d", res);`
	`                break;`
	`    case '*':   res = a-*b;`
	`                printf("%d", res);`
	`                break;`
	`    case '/':   if(b==0)`
	`                printf("error :Divided by 0");`
	`                else`
	`                {`
	`                res = a/ b;`
	`                printf("%d", res);`
	`                }`
	`                break;`
	`    default:    printf( "invalid op");`
	`    }`
	`getch();`
	`}`