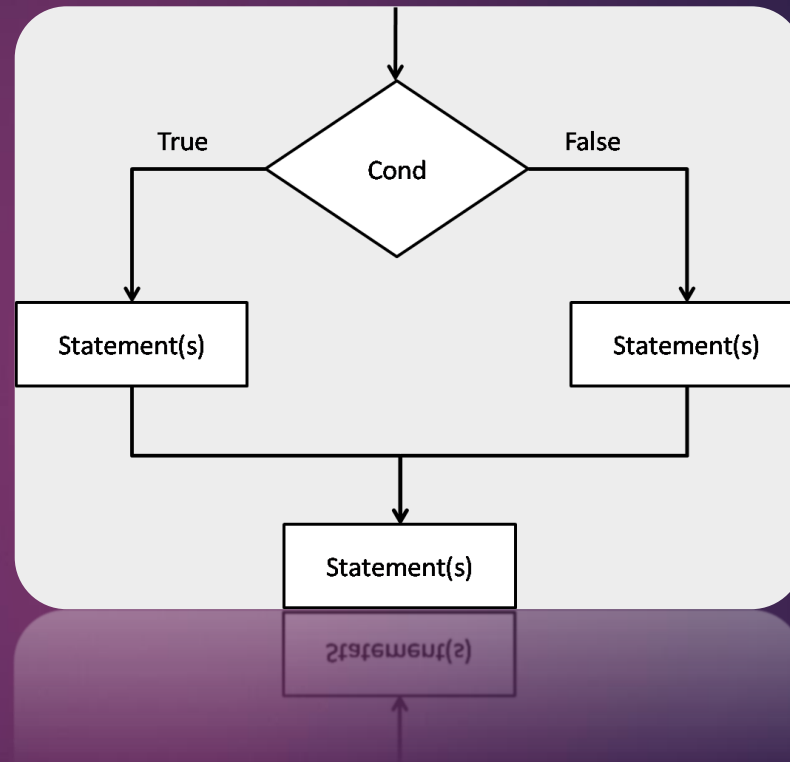


Control Statements

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Department of Computer Engineering,

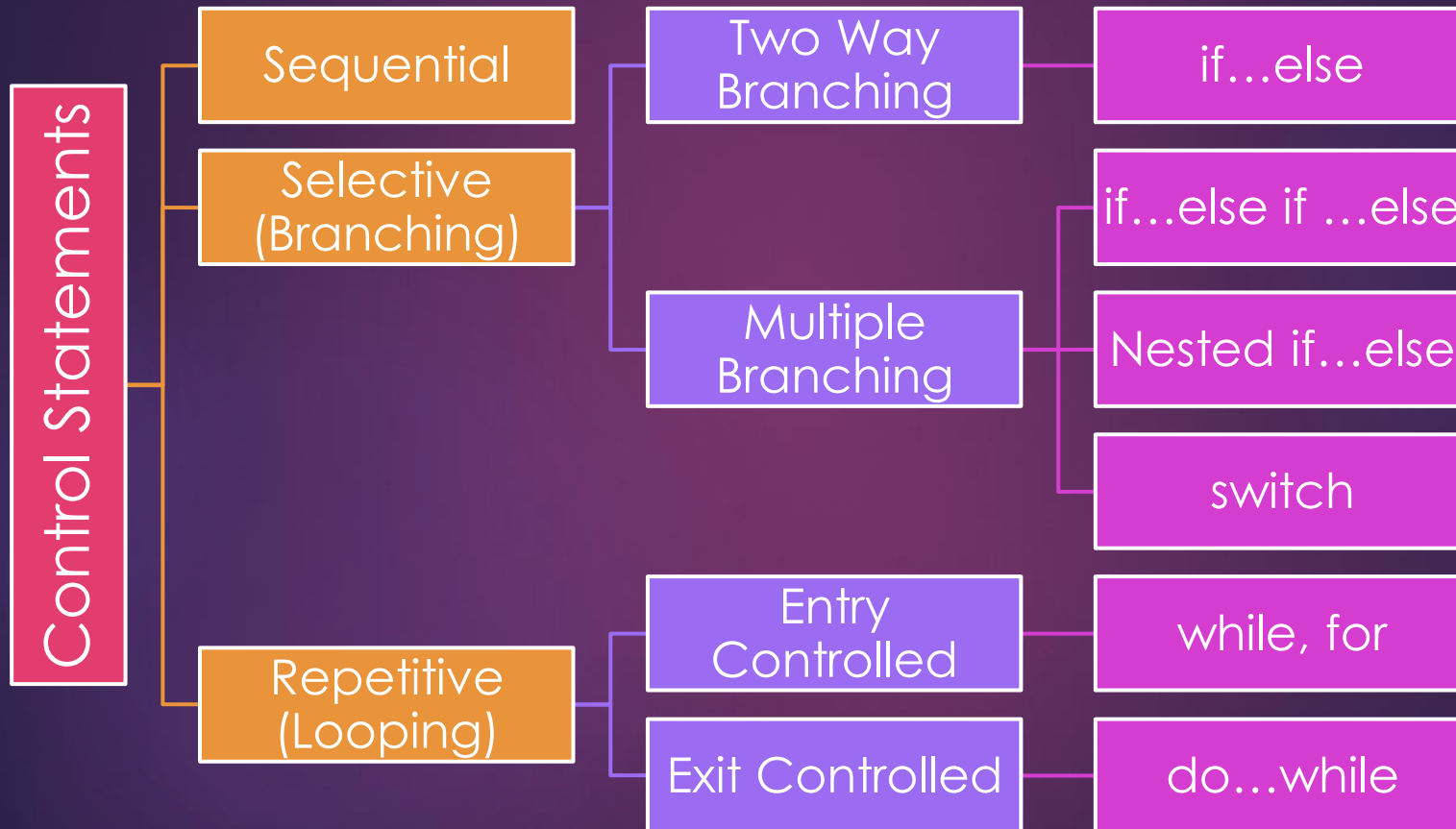
Khwopa College of Engineering



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2019-12-10

Basic Control Statements

2



Control Statements

Decision Making Statements

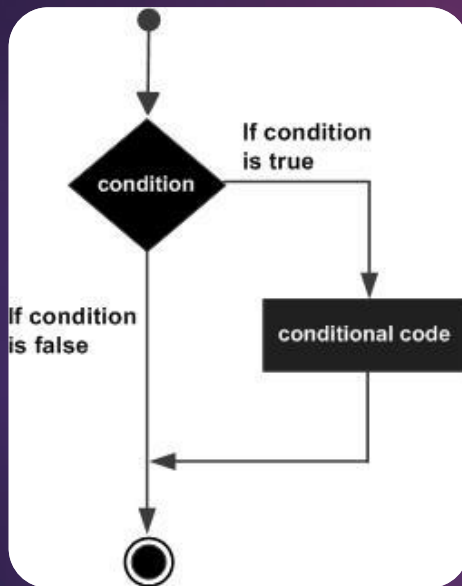
- ▶ if statement
- ▶ If...else statement
- ▶ if...else if statement
- ▶ Nested if...else statement
- ▶ switch statement

Loop Statements or Repetitive Constructs

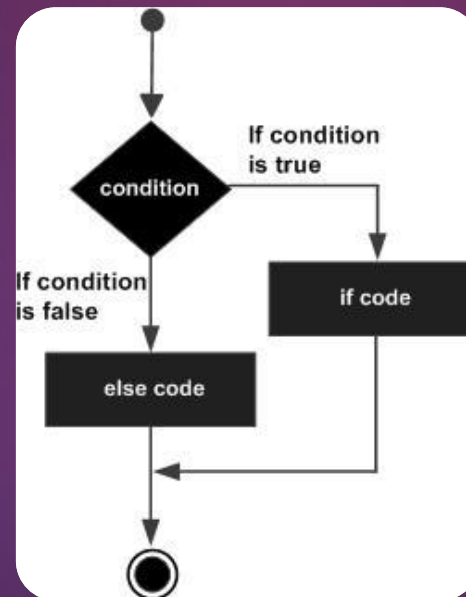
- ▶ for loop
- ▶ while loop
- ▶ do...while loop

Decision Making Statements

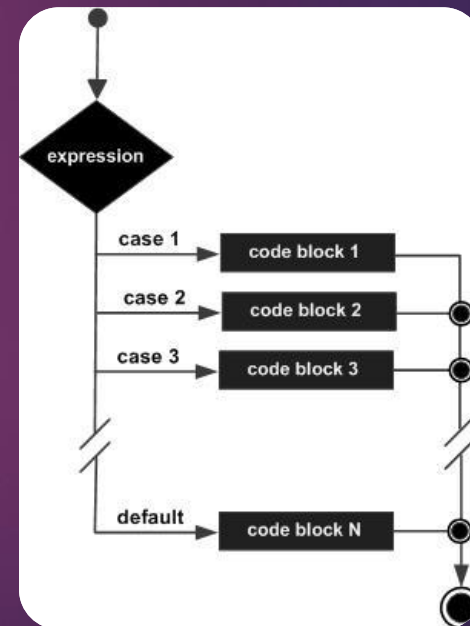
if



if...else



switch



- Ladder if?
- Nested if?

Class Work

5

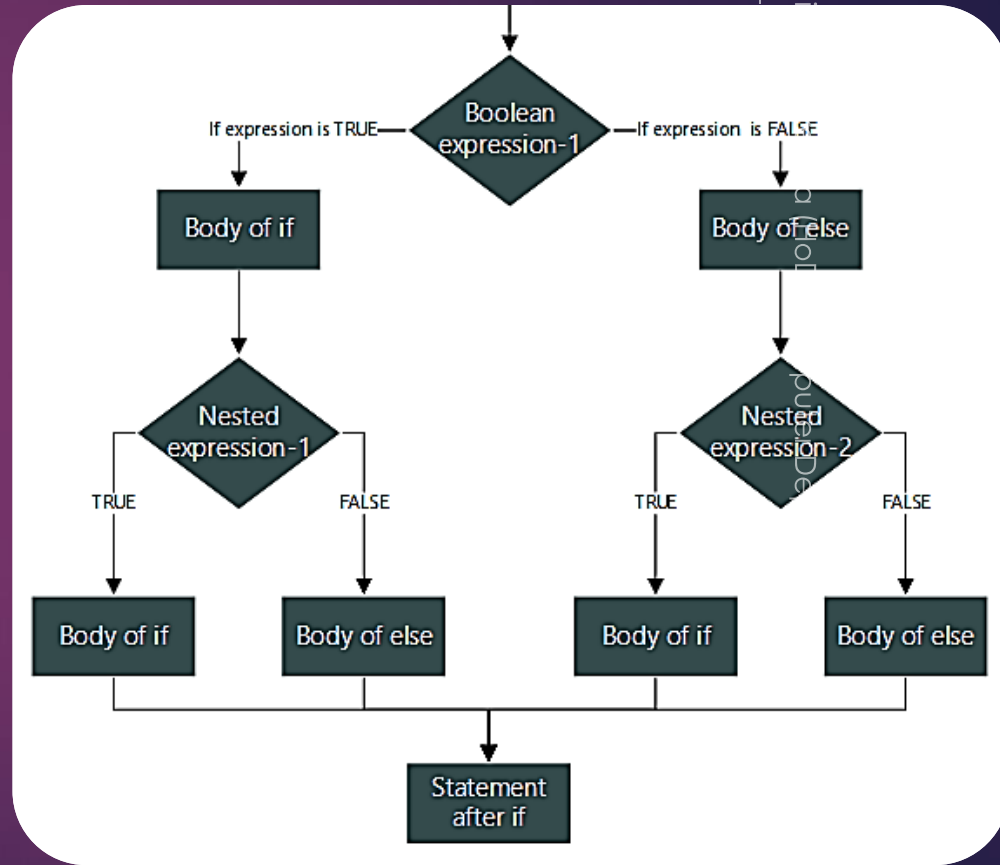
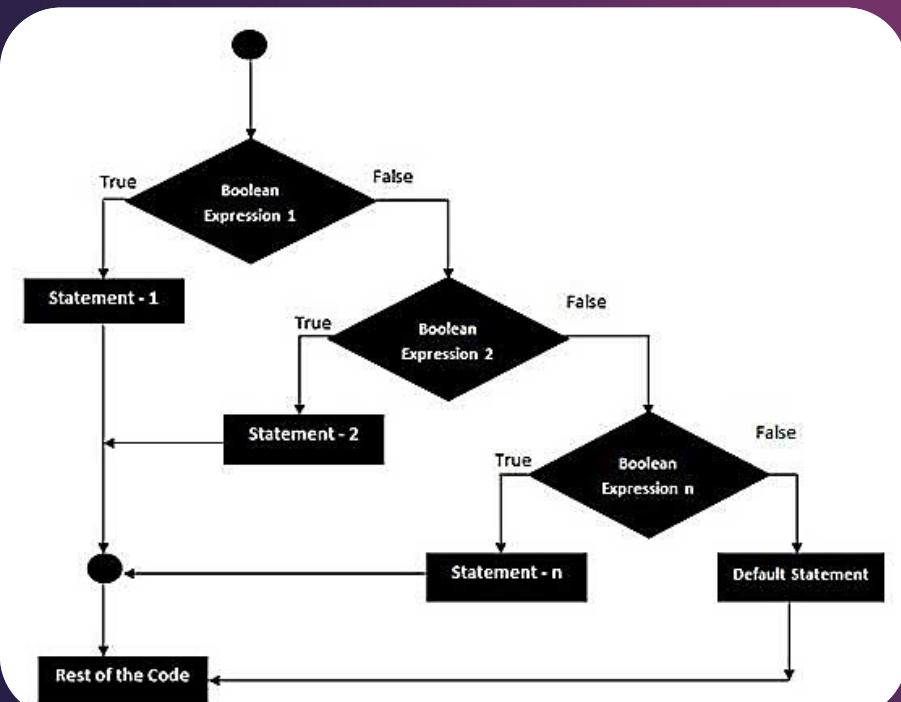
- ▶ WAP to display fail if student obtained mark less than 40.
- ▶ WAP to display fail if student obtained mark less than 40 otherwise pass.

Decision Making Statements (2)

6

Er. Sh
2019-

Ladder if



Class Work

7

- ▶ WAP program to display grade as per mark obtained by student using ladder if:
 - ▶ A+ - 95 or Above
 - ▶ A - 90 or Above
 - ▶ B+ - 85 or Above
 - ▶ B - 80 or Above
 - ▶ C+ - 70 or Above
 - ▶ C - 60 or Above
 - ▶ D+ - 40 or Above
 - ▶ D - 35 or Above
 - ▶ E - Below 35

Eg#1: Picking Largest of 3 nos.

8

```
C5_1.C x
1 #include<stdio.h>
2 #include<conio.h>
3 void main(){
4     int a, b, c; clrscr();
5     printf("Enter the value of a, b, and c: ");
6     scanf("%d%d%d", &a, &b, &c);
7     printf("\na = %d, b = %d, c = %d\n", a, b, c);
8     if(a>b){
9         if(a>c)
10            printf("a = %d \n", a);
11        else
12            printf("c = %d \n", c);
13    }
14    else{
15        if(b>c)
16            printf("b = %d \n", b);
17        else
18            printf("c = %d \n", c);
19    }
20    getch();
21 }
```

Possible Tests

• 1	2	3
• 3	2	1
• 1	3	2
• 5	5	4
• 4	6	6
• 7	7	7
• 5	8	5
• -1	9	4

Alternative method to pick the largest of 3 nos.

```
#include<stdio.h>
#include<conio.h>
void main(){
    int a, b, c, big;
    printf(" enter the value of a, b, and c");  scanf(" %d %d %d ", &a, &b, &c);
    big = a;
    if (b>big)
        big = b;
    if (c>big)
        big = c;
    printf(" \n the largest number is %4d ", big); getch();
}
```

Assignment

10

- ▶ Pick smallest no. among entered five numbers.

Largest of four numbers

using nested if-else

11

Er. Shiv
2019-1

```
CS_3.c x
1  /* Largest of four numbers using nested if-else */
2  #include<stdio.h>
3  #include<conio.h>
4  void main(){
5      int a,b,c,d; printf("Enter four numbers:");
6      scanf("%d%d%d%d",&a,&b,&c,&d);
7      if(a>b){
8          if(a>c){
9              if(a>d)
10                 printf("Maximum is %d", a);
11             else
12                 printf("Maximum is %d",d);
13         }else{
14             if(c>d)
15                 printf("Maximum is %d",c);
16             else
17                 printf("Maximum is %d",d);
18         }
19     }
20     else{
21         if(b>c)
22         {
23             if(b>d)
24                 printf("Maximum is %d",b);
25             else
26                 printf("Maximum is %d",d);
27         }
28         else
29             if(c>d)
30                 printf("Maximum is %d",c);
31             else
32                 printf("Maximum is %d",d);
33         }
34     getch();
35 }
```

Largest of four numbers using if-else and && operator

```
C5_4.c
1  /* Largest of four numbers
2  using if-else and && operator */
3  #include<stdio.h>
4  #include<conio.h>
5  void main(){
6      int a,b,c,d;
7      scanf("%d%d%d%d",&a,&b,&c,&d);
8      if(a>b && a>c && a>d)
9          printf("Maximum is %d",a);
10     else if(b>a && b>c && b>d)
11         printf("Maximum is %d",b);
12     else if(c>a && c>b && c>d)
13         printf("Maximum is %d",c);
14     else
15         printf("Maximum is %d",d);
16     getch();
17 }
```

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2019-12-10

if statements

13

Syntax:

```
if (expression){  
    Statement;  
}
```

Nested if

```
if (expression){  
    Statement;  
    if (expression){  
        Statement;  
    }  
}
```

Ladder if

```
if (expression){  
    Statement;  
}else if (expression){  
    Statement;  
}
```

if-else statements

14

The *general form* of if statement is

```
if (expression){  
    Statement;  
}else{  
    Statement;  
}
```

Program to calculate the number of days in the months

- ▶ “ 30 days has September, April, June, and November”
- ▶ “ All the rest have 31 days except February alone”
- ▶ “ February have 29 days in Leap year and 28 in other years”
- ▶ The program will ask the user to enter month and year and the rest of the calculations are performed using if-else condition.

Program

16

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```
C5_5.c
1  /* Program to calculate the number of days in the months */
2  #include<stdio.h>
3  #include<conio.h>
4  void main(){
5      int m, y, d;
6      clrscr();
7      printf("Enter Month: ");
8      scanf("%d", &m);
9      printf("\nEnter Year: ");
10     scanf("%d", &y);
11     clrscr();
12     if (m == 2){
13         if((y%400 == 0) || (year%4 == 0 && year%100 != 0))
14             d = 29;
15         else
16             d = 28;
17     }
18     if(m != 2){
19         if((m == 4) || (m == 6) || (m == 9) || (m == 11))
20             d = 30;
21         else
22             d = 31;
23     }
24     printf("No. of days in the %d year and %d month is : %d", y, m, d);
25     getch();
26 }
```


switch Statement

17

Syntax:

```
switch(expression){  
    case constant_1:  
        Statements;  
        break;  
    case constant_2:  
        Statements;  
        break;  
    default:  
        Statements;  
}
```

Program displaying day using the switch statement depending upon the number entered

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```
C5_6.c
1  /* Displaying day using the switch statement
2  depending upon the number entered */
3  #include <stdio.h>
4  #include <conio.h>
5  main(){
6      int choice;
7      printf("Enter the number of day:");
8      scanf("%d",&choice);
9      switch(choice){
10         case 1: printf("Sunday");
11                break;
12         case 2: printf("Monday");
13                break;
14         case 3: printf("Tuesday");
15                break;
16         case 4: printf("Wednesday");
17                break;
18         case 5: printf("Thursday");
19                break;
20         case 6: printf("Friday");
21                break;
22         case 7: printf("Saturday");
23                break;
24         default: printf("Invalid option given");
25     }
26     getch();
27 }
```

Loop/Iteration/Repeating Construct

19

Loop Type & Description

while loop

- ▶ Repeats a statement or group of statements while a given condition is true. It tests the condition before executing the loop body.

do...while loop

- ▶ It is more like a while statement, except that it tests the condition at the end of the loop body.

for loop

- ▶ Executes a sequence of statements multiple times and abbreviates the code that manages the loop variable.

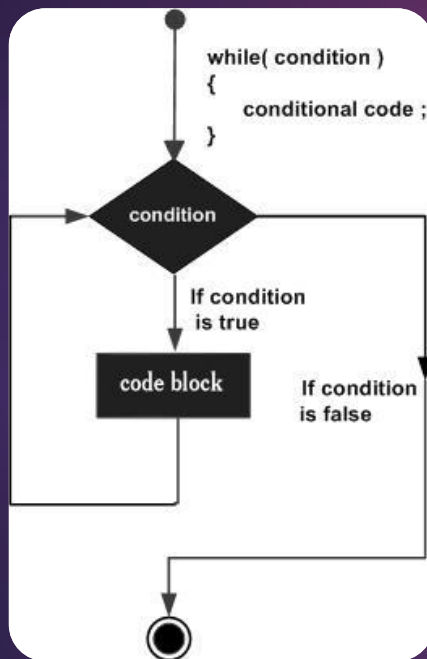
nested loops

- ▶ You can use one or more loops inside any other while, for, or do..while loop.

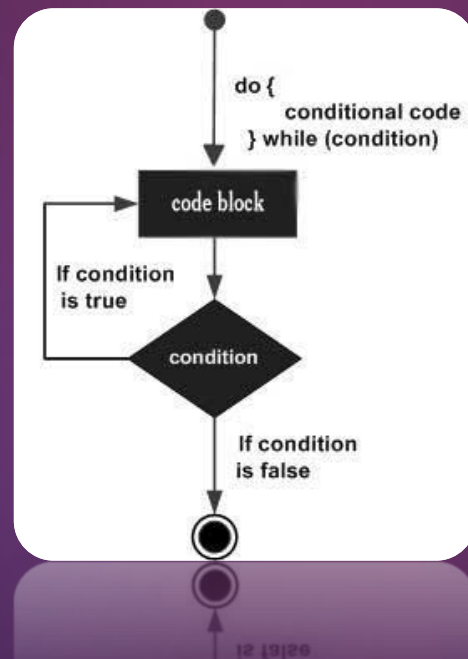
Loop Types

20

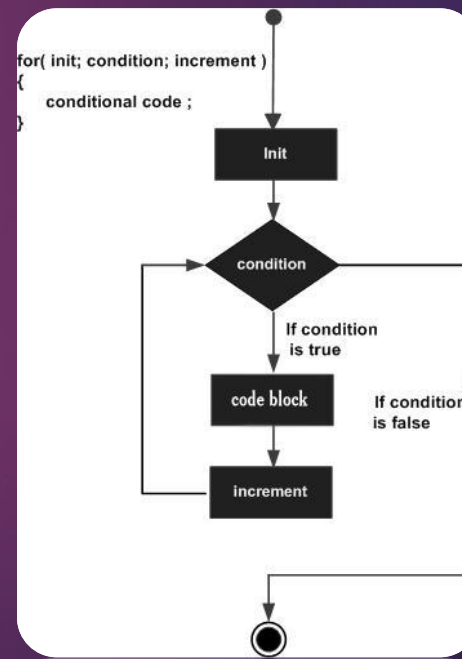
while



do...while



for



Loops

21

Syntax:

```
while(condition){  
    statement1;  
    statement2;  
}
```

Syntax:

```
for ( initialization; condition; update ) {  
    statement(s);  
}
```

Syntax:

```
do{  
    statement1;  
    statement2;  
}while(condition);
```

Program to print numbers from 1-10

```
#include<stdio.h>
#include<conio.h>
main(){
    int number=1;
    while(number<=10){
        printf("%d ",number);
        number++;
    }
    getch();
}
```

Calculate factorial of a given no.

23

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```
CS_7.c x
1  /* Calculates factorial of a given number */
2  #include<stdio.h>
3  #include<conio.h>
4  void main(){
5      int a = 1, n;
6      long float fact = 1;
7      printf("Enter the value for n:");
8      scanf("%d",&n);
9      while(a<n){
10         a++;
11         fact *= a;
12     }
13     printf("Factorial of given no. is: %ld",fact);
14     getch();
15 }
```

Program to find the sum of odd numbers using do...while loop

24

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```
C5_8.c
1  /* Program to find the sum of odd numbers using do...while loop */
2  #include <stdio.h>
3  #include <conio.h>
4  void main(){
5      int n, sum=0, i=1;
6      printf("Enter the value of n:");
7      scanf("%d", &n);
8      do{
9          sum+=i;
10         i+=2;
11     }while(i<=n);
12     printf("The sum of odd number is %d",sum); getch();
13 }
```


Program to accepts a character and returns its ASCII value

C5_9.c

```
1  /* Program to accepts a character
2  and returns its ASCII value */
3  #include <stdio.h>
4  #include <conio.h>
5  void main(){
6      char ch, answer;
7      do{
8          printf("Enter any character:");
9          scanf(" %c", &ch);
10         printf("\nThe ASCII value of alphabet: %c = %d", ch, ch);
11         printf("\nWant to continue?");
12         scanf(" %c", &answer);
13     }while(answer=='y' || answer=='Y');
14     getch( );
15 }
```

C:\Users\ErSKS\Google Drive (c.khwopa@gm

Enter any character:a

The ASCII value of alphabet: a = 97

Want to continue?y

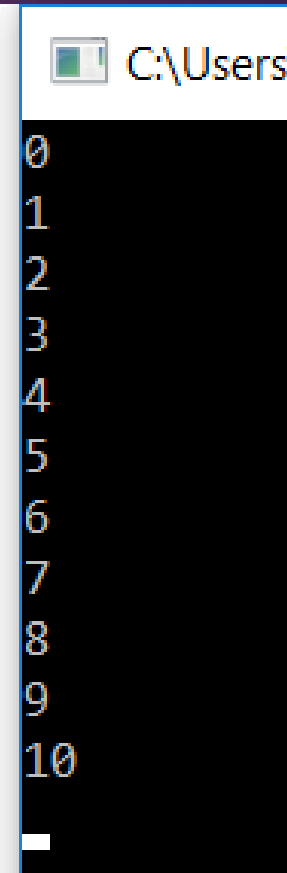
Enter any character:A

The ASCII value of alphabet: A = 65

Want to continue?_

Program to display the numbers from 0 to 10 using for loop

```
1  /* Program to display the numbers
2  from 0 to 10 using for loop */
3  #include <stdio.h>
4  #include <conio.h>
5  void main(){
6      int i;
7      for(i=0;i<=10;i++)
8          printf("%d\n",i);
9      getch();
10 }
```



```
0
1
2
3
4
5
6
7
8
9
10
```

Program to find sum & avg of given numbers

27

C:\Users\ErSKS\Google Drive (c.khw

```
How many numbers you want? 7
Enter a number:6
Enter a number:7
Enter a number:4
Enter a number:3
Enter a number:2
Enter a number:-9
Enter a number:0
Sum = 13.000000
Average = 1.857143
```

```
C5_11.c
1  /* Program to find the sum and
2  the average of given numbers */
3  #include<stdio.h>
4  #include<conio.h>
5  void main(){
6      int n,i;
7      float sum=0.0,a,average;
8      printf("How many numbers you want? ");
9      scanf("%d",&n);
10     for(i=0;i<=n-1;i++){
11         printf("Enter a number:");
12         scanf("%f", &a);
13         sum += a;
14     }
15     average = sum/n;
16     printf("Sum = %f",sum);
17     printf("\nAverage = %f",average);
18     getch();
19 }
```

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Patterns

28

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Pattern1

```
*****
*****
*****
*****
*****
```

Pattern2

```
*****
****
***
**
*
```

Pattern3

```
      *
     **
    ***
   ****
  *****
```

Pattern4

```
*****
  ****
   ***
    **
     *
```

Pattern5

```
      *
     **
    ***
   ****
  *****
 *****
 *****
  ****
   **
    *
```

Pattern6

```
  *
 * *
* * *
```

Pattern7

```
  *
 ***
*****
```

Pattern8

```
1
2 3
4 5 6
7 8 9 10
```

Pattern9

```
10
9 8
7 6 5
4 3 2 1
```

Generate pyramid format

29

```
C5_12.c
1  /* Program to generate number in pyramid format */
2  #include<stdio.h>
3  #include<conio.h>
4  void main(){
5      int p,q,a,k,l;
6      printf("\nEnter the value for pyramid:");
7      scanf("%d",&a);
8      for(p=1;p<=a;p++)          /*for a row implement*/
9      {
10         for(q=a;q>p;q--)        /*for the space(s)*/
11             printf(" ");
12         for(k=1;k<=p;k++)        /*for previously printed number*/
13             printf("%d",k);
14         for(l=p-1;l>=1;l--)      /*for printing new nos.*/
15             printf("%d",l);
16
17         printf("\n");
18     }
19     getch();
20 }
```

C:\Users\ErSKS\Google Drive (c.khw

Enter the value for pyramid:5

```
1
121
12321
1234321
123454321
```

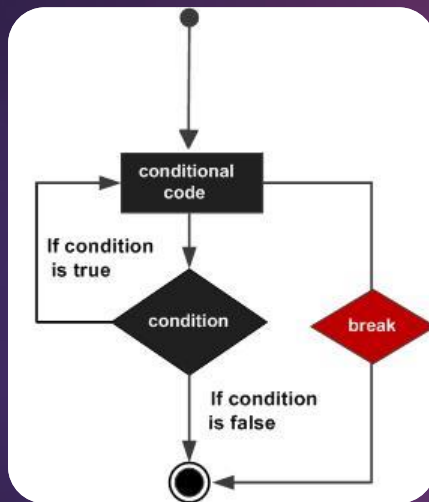
Computer Department)

Loop Control Statements

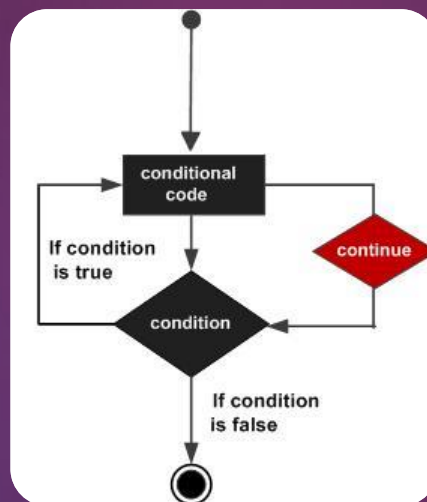
30

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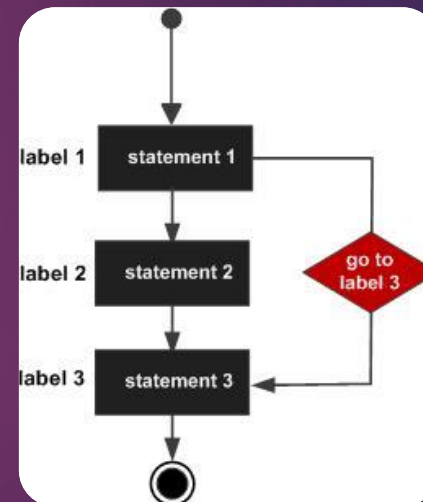
break



continue



goto



break & continue Statement

31

```
1 #include<stdio.h>
2 #include<conio.h>
3 void main( ){
4     int i;
5     clrscr();
6     for(i = 0; i < 5; i++){
7         printf("%d. Bhaktapur\n", i);
8         if (i==2){
9             break;
10        }
11        printf("- Khwopa\n");
12    }
13    getch();
14 }
```

```
DOS
BOX
DOSBox 0.7
0. Bhaktapur
- Khwopa
1. Bhaktapur
- Khwopa
2. Bhaktapur
```

```
1 #include<stdio.h>
2 #include<conio.h>
3 void main( ){
4     int i;
5     clrscr();
6     for(i = 0; i < 5; i++){
7         printf("%d. Bhaktapur\n", i);
8         if (i==2){
9             continue;
10        }
11        printf("- Khwopa\n");
12    }
13    getch();
14 }
```

```
DOS
BOX
DOSBox 0.7
0. Bhaktapur
- Khwopa
1. Bhaktapur
- Khwopa
2. Bhaktapur
- Khwopa
3. Bhaktapur
- Khwopa
4. Bhaktapur
- Khwopa
```

Check prime or not?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

First 10 Prime Numbers

Notice?

2, 3, 5, 7, 11, 13, 17, 19, 23, 29

C:\Users\ErSKS\Google Drive
Enter a number: 15
Not Prime Number

C:\Users\ErSKS\Google Drive
Enter a number: 17
Prime Number

C:\Users\ErSKS\Google Drive
Enter a number: 1
Not Prime Number

C5_15.c

```

1  /* Check prime or not? */
2  #include<stdio.h>
3  #include<conio.h>
4  void main(){
5      int num, i, flag=0;
6      printf("Enter a number: ");
7      scanf("%d", &num);
8      if(num<2){
9          flag=1;
10     }else{
11         for(i=2;i<=num/2;i++){
12             if(num%i == 0){
13                 flag=1;
14                 break;
15             }
16         }
17     }
18     if (flag==0){
19         printf("\nPrime Number");
20     }else{
21         printf("\nNot Prime Number");
22     }
23     getch();
24 }

```


Calculate the average of the non-negative numbers

DOSBox 0.74, Cpu speed: max 100% cycles,

How many numbers? 6

X = -9

X = 36

X = 0

X = 1

X = 2

X = 3

The average is 8.400000._

```
C5_16.c x
1  /* Calculate the average of the
2  non-negative numbers in a list of numbers */
3  #include<stdio.h>
4  #include<conio.h>
5  void main(){
6      int n, i, count=0;
7      float x, average, sum=0;
8      printf("How many numbers? ");
9      scanf("%d", &n);
10     for(i=1;i<=n;i++){
11         printf("X = ");
12         scanf(" %f ", &x);
13         if(x < 0){continue;}
14         sum += x;
15         ++count;
16     }
17     average = sum/count;
18     printf("\nThe average is %f.", average);
19     getch();
20 }
```

goto Statement

34

Syntax:

```
goto label;
```

```
...
```

```
label:
```

Check whether a person can vote or not?

```
1  /* Check whether a person can vote or not */
2  #include<stdio.h>
3  #include<conio.h>
4  void main(){
5      int age;
6      clrscr();
7      printf("Enter Age: ");
8      scanf("%d", &age);
9      if (age<18)
10         goto reject;
11     else{
12         printf("Yes, you can vote.");
13         exit(0);
14     }
15     reject: printf("You cannot vote.");
16     getch();
17 }
```



DOSBox 0.74, Cpu

```
Enter Age: 19
Yes, you can vote.
Enter Age: 5
You cannot vote.
```

partment)

Q/A?

36

Thank You!

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2019-12-10