* Write a C ? UNIT-2 Decision Making and Arrays. Witness Hillard * Branching And Loops: * Branching Statements: we will implement these kind of statements in we want to execute some set of statements if the condition is satisfied for algorith on should be of There are a types: 1) Variante of if &) Switch * Varients of it =) simple it - else it 7 else if ladder of mested if * Simple it :to the concept of Syntax! It condition statements of (condition) Statements; simpleit Flow chart :condition false (true stmts. stmts-xef

include 15 int main C ent age scanfl" of lage Print Print + return * else 1/: Syntan: ?

flow chart

Str

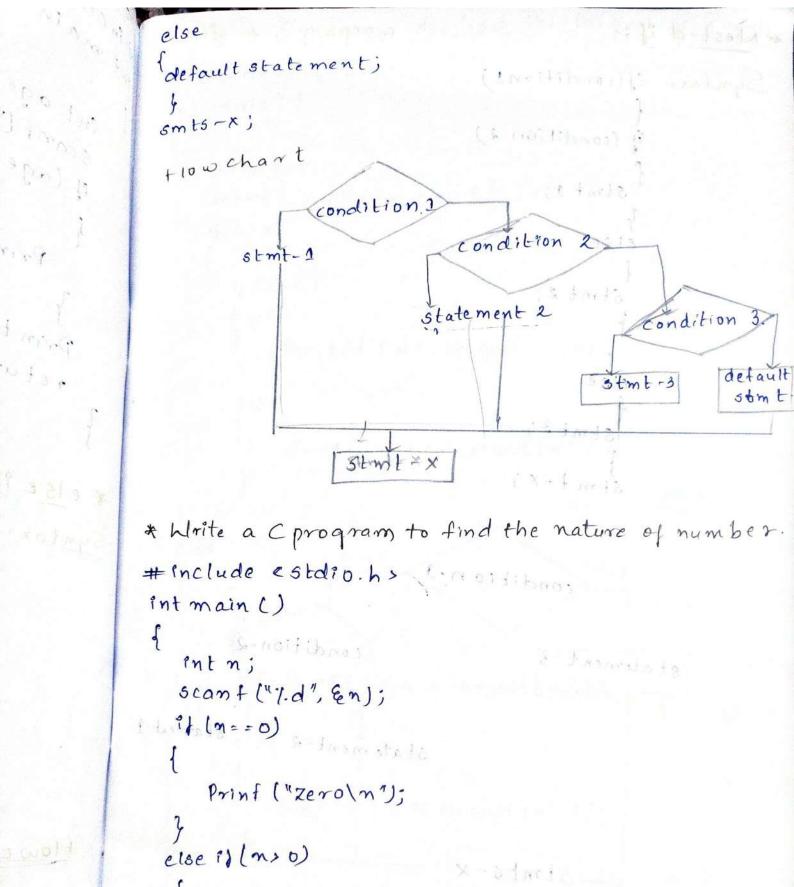
```
The Ich an
            write a C program whether a person is retired
S. MAN Sample
             #include 1 stdio. h>
             int main ()
                                          ed Dible + build of the
                                                 ( I minum for
                intage;
                scanf ["1.d", & age);
                11 (age >=60)
nts in
                                     scanfleyed " fage);
ts if
 od hace
                  Printf ("Retired \n");
inal pm
               Print+ ("+lello"); of 3 lange 12 + 1 mint
rannen
               return 0;
                  Print + Calot Eligible to sole long);
          * else if :-
PYYJAT
         Syntan: if (condition)
                                       ( " ansit") time
                                               in wonder
                     stmts 1;
90 M 30
                   clse
                     Stmts 2;
                                                ( I (rolli hear) [
Fah
                                                  J. C. Bramstall
                    Stmts-n;
       flow chart
                         condition
                                    stmts 1
             Stmts 2
                          stmts-x
```

```
* Write a c program whether a person is eligible
                                                     else
                                ed with to salt with bo
                                                     Solefault stat
to vote or not.
                                       ( ) relative
# include estdio. h>
                                                      smt5-x;
 int main ()
                                                      +10 w chan
                            ( ( po & b. ) ims
      înt age
                                   (03 × 3pr)
      scanf ("%.d", &age);
       it (age >= 18)
                         Yound of ("Refined \n"):
          Print d'Eligible to Voteln");
                                      O wrole.
       else
          Print f ("Not Eligible to vote In");
                              ( noilibros) [
                                                        * Write o
        Printf ( Hello");
                                                        # Include
       return 0;
                                Laferia
                                                         int main
* else-if ladder:-
                                                            int n
                                                            scan.
if (condition 1)
                               is charles
                                                        1 tit la=
 Statement 1;
                               Stanta M.
 else it (condition 2)
 statement 2;
                                                            else il
 else of (condition 3)
  statement 3;
   else 11 (condition n)
     toment n;
```

str

Pri

ret.



Print & ("Negative \n");

Printf ("Hello);

return o;

1 10/100

a wold

* Mested ifin closin states. Syntan if (condition1) if (condition 2) stmt1; frolling. gelses wordings 1 - for 1 A Stmt 2; Huston else stmt3; stmt-x; * white a corregion to find the nature of number. False condition-1 () Niora Ini (condition-2 statement-3 5 tatment-1 statement-2 Print ("zenolm"); Stmt6-X ("ar/aritagesta") to fac. I

```
x white a C program to find the largest of 3 rumbers
#includezstdio.h>
 int main()
                   become to be provided in the party
    home radions schrong branchts dashing it
    inta, b, c;
    scanf ("1.d1.d1.d", &a,&b, &c);
                        a largerated difficult and co
    if (a>b)
               ro et disser all deten et elemation
      of (asc)
  elmonth of list of statt from to
      Printfl'1.d is largest \n",a);
      else else
          Printf (1.d 1s (argest \n", c);
         The flow of ronlivel transfers to state m
  led worth the first case value that match
  else en ada en haquer deserbala yourd a mallo
       tall towards a seech coses at a more that
      il (b>c)
           sonds used in Switch statem
       Pr Printf ["1.d :s largest In 2 b);
       else
         Printf("1,d is largest \n", c);
 return o
```

* Switch: Synton (> Switch is a multiway decision making statement =) It is a branching statement in C. case Le =) The switch statement provides another way to decide which statement to execute ment case The switch statement evaluates an expression, then attempts to match the result to one of several Possible cases. - Each case contains a value and a list of statements > The switch case statement is used when we have multiple options and we need to perform a different task for each option =) The flow of control transfers to statement associated with the first case value that matches. 7 Often a break statement «6 used as the last. statement in each case's statement list. * Keywords used in Switch statement. of the keywords used are * Switch Provide () d to longest In (); * case * default * Break

case

cas

O Health

```
Syntaxis prob out thing of marporg ) a stick &
 switch (cenp>)
 case <exp-val-1>:statements block-1
  case ceap-val-2>: statements block-2
  case cemp-val-3>: statements block-3
   case cexp-val-N>:statements block-N
       default: default statements block
   Nent-statement; book ") 11 x 29 5 500
                case s: Print of l' Tuesday lm
          · flowchart:
             switch
          conditional statement
                           Statements break:
              case 1
                           statements break:
            False
              case
             False
                           statements
              case
                            statements break!
             False
               case n
             False
                           statements break
               default
                                            Statemen
```

statemen under owitch

```
* Write a Cprogram to print the day of a week
using switch case
# include 25tdio.h>
 int main ()
    int n;
    scanf ("1.d", &n);
    switch (n)
       case 1: Printf("Sunday(n");
       break;
       case 2: Printf ("Monday (m");
       break;
       case 3: Print f ("Tuesday (n");
       break;
       case 4: Printf ("nlednesday (m");
       break;
      case s: Print + ( "Thursday In");
       break;
       case 6: Print + ( Friday (n');
       break;
       case 7: Print f ("Saturday \m");
       detault: Printfl" Invalid Option");
       break;
        break;
```

Loops:

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and again

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1) Entr

2) - Eni

* For 8

Synta

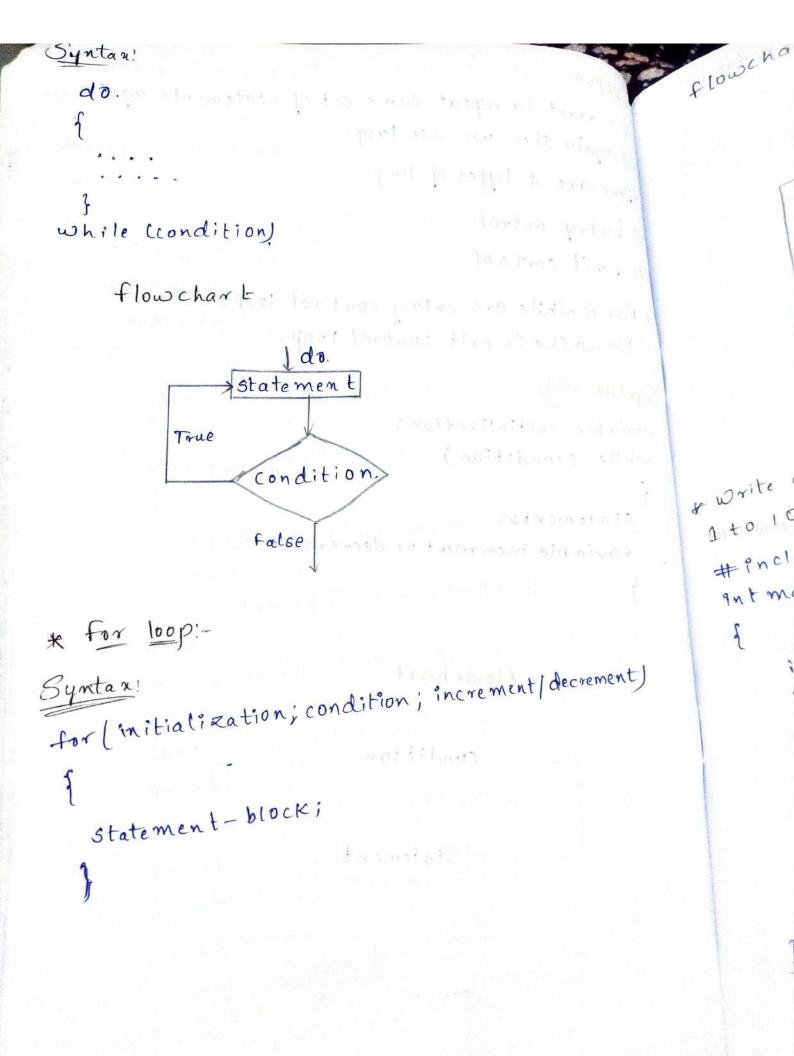
varia

whil

Do

Loops:-If I want to repeat same set of statements again and again then we use loops. There are a types of loops 1) Entry control 2)-Enit control. * For & While are entry control loops. whereas Do while is exit control loop. Synton Whyle variable initialization; while (condition) statements; variable increment or decrement: tramanable flowchart rollibron; rollessibilized and condition. i Mould - Instructed? Statement

MAL STAT.



flowchart un id tour of margon of initialization condition True Statement Incridecr & write a Cprogram to print the numbers 1 to 10 using while loop. #include estdio.h> Int main () 1 int 1; i= 1; while (1 2 = 10) (++1:01-11:0-11 x0) Print f ("1. do.", 9); (1 1 b. 1") 1 1 ming 1++ return o;

```
* Write a c program to print the numbers from
                                                   * Nested
                                                    for Linit
 I tolo by using do while loop.
  # include estdio. hs
                                                     f for (1)
  Int main ()
                           Callebras
       int i;
        1=9;
                           I mamaloje
       do
                                                     * MOTE!
          Printf ("1.d", ");
                                                     * Jump'
          1++
                                                      =) These o
        } while (12 = 10);
        return 0; all thing of morpores a street
                                                      =) There
                                                       1) Brea
                       esmy stile press
                                                       2) cont
* Write a C program to print the numbers from 1 his
                                                         5) Ex
by using for loop.
                                         () MIDNETHI
                                                         4) 91
# include estdio.hs
                                                        * Br
int main ()
                                         1 1 01
                                                         The 1
                                  (O) = 2 73 MIACO
                                                         contr
     int ij
     for (1=1; 12=10; 1++)
                                                         Syn
                          1 (P. " >6 P. " 1 + + mint
        Print+ ("1.d", ");
                                      O WALL THE
     return Oj
```

bre

Flou

* Nested for loop! to enveloped at manpoon a posterior for linitialization; condition; increment/decrement) for (initialization; condition; increment/decrement) statement ; Autoolesi tail 3 * NOTE: for (;);) leads to infinite loop * Jumping statements= of These are also known as unconditional statements of There are 4 types: 1) Break y continue 3) Enit Of is sometimes elected ble to skip some statemen ENSIDE THE TOOP. IN SUCK 10265, EDNTIALLE OLDERNENS * Break statement !-The break statement is used within the looping control state ments, switch statement and nested loops. Syntam for the break statement is: break; flowchart_ test condition within loop from previous

* Write a C1 * Write a C program to implement break # include 25t # include < stdio.h> int main () 'mt main () int 1) int i; forli for (i=1; iz=10; i++) breaki else Print + ("1.d", "); return 0; Output 1-* continue: It is sometimes desirable to skip some statements , 2 3 inside the loop. In such cases, continue statement is used * Enit Syntaniquel set weather been of transfels thank sell This P * Go to 1 continue; * 90 to Test condition * We continue within for loop Progr of got falsenois it had book Remaining part | 100 to Ther of 100 P

if

10

ret

2) (

```
& Write a C program to implement continue.
 # include < stdio. hal. 1
  int main () possessolo 12
   4
      for (1=1; 12=10; i++)
      to suif (i==5) I promotion of morpory a stirring
                                  ed mikle saboliki de
         continue;
                                             ( lylaw jvi
         else
         Print f ("1.d",i);
                                        - 1 = W 1 W
       return Oi
                                                 take!
                               Total ( ( y d ", m);
 Output !-
 , 23 4678 9 10.
                                         ( of a 1.10 ) 13
                                       fiedel of op
 * Enit
 This prog function is used to come out of the program
* Go to!
* go to statement is used for unconditional jumping.
* We can more the control from any part of the
 Program to any other part of the program with the help
 of goto statement
no There are a types
· O forward jump
 2) Backward jump
```

* Forward jump Backward jump 53) Write Label: E # incl goto label-Statements; int mo Labeli e goto label: Statements; * Write a C program to implement goto statement # include < stdio.h> int main () 41. "b.1") & IxI-9 int n = 1; 10 molis label: Printf ("1.d", n); 91++; if (n 2 = 10) goto label; son return 0; no smos of book of noit small pool state of of output a go to statement is used for unconditional jum and to they pres more fortion and some moral of the fragram to any other good of the programm with the help Labored & American Control of

5C

* W

1

in

```
53) Write a C program to print fibonacci numbers upton
 #include < stdio. h>
 int main ()
    int n, i, a, b, c;
    scan f ("1.d", &n);
    a = 0;
    b= 1;
    Print f ("1. d 1. d", a, b);
    while (12=n-2)
          C=a+b.
          Printf ("1.d", c);
          a = b;
          b= ()
          1++;
* Write a C program to check whether agiven
 number is prime or not.
 #include < stdio. h>
  int main()
     int n, c = 0, i;
    scan f("1.d", En);
    for (i=2; izn; i++)
       1 f (n/. 9 = = 0)
       C++
     if (c== 0)
    Print f("1.d is prime", n);
    Printf ("1, d's not Prime", n);
    · return o)
```

```
* write a C program to generate the following
  Pattern
   1)
           2
                                                       #in clude 1
                                      1 2 3 4
                4
 i) # include < stdio. h>
                                                            scan
 int main ()
                                                            forc
                                       ( C - N - 2 1 ) 3 1 2 5
       int i, j, n;
      scanf ("1.d", En);
      for ( i=1; iz=n; i+t)
         for (j=1;j = i;j++) ((), b.)
                                            13 1
         Print + ("1. d", i);
        Print + ("In");
                                                            # 10
2) # include 1stdio.h>
                                                              int
   int maint)
       int i,j, n;
       scant("1.d", &n);
       for (i=1; 12=n; i++)
           for (j=2; j'=1; j++)
           Print +(" 1.d ",1);
           Print + ("\n");
```

```
* * * *
 * * * *
#include & stdio.h>
 int main ()
 1
   int i,j, m;
   scanfl"7.d1, &n);
   for(i=1;i2=n;i++)
     for (j=1;jl=n;j++)
     Print + (" * ");
     Printf("In");
       of all states a your has the contracting
      A A A Secretary Admirals Admirals
# include & stdio. h.
 int mainc)
   inti, jinista le an man ant al masse
  scan+ ("7.d", &n);
   for(i=1;iL=n;i++)
    for (j=2; j L=1; j++)
    Print f("* ");
     Print + ( "1 m");
```

* Compile time! Arrays: The different t Defn: An array is a fixed size sequenced collects follows! 1) Pritialise of elements of the same data type en intalk

Examples.

=> List of employes in an organization

=> List of products and their cost

=) Test scores of a class of students

=) List of customers and their telephone numbers etc

* Types of arrays:

=) One-dimensional arrays

a 2-D arrays

a Multidimensional arrays.

A list of items can be given one variable name using only one subscript and such a variable is called a single-subscripted variable or a 1-D array

* Declaration of 1-Darray:

=) Datatype arrayname [size]; where size represents the man no. of elements that an array can hold.

Dutialisation of 1-D array:

a The initialisation of 1-D array can be done in a ways

1) Compile time

2) Runtime

3) Pritia

2) Partial in

En int al

Ex. intalo)

y) Initia en ant

> * Runtorc

scan

* Compile time! The different types compile time intilisation are as follows!

1) Initialise all the values:

en inta [
$$\pi$$
] = $\{11, 12, 13, 14, 15\}$.

en inta [π] = $\{11, 12, 13, 14, 15\}$.

2) Partial initialization:

3) Pritialize with all zeroes:

$$e^{x}$$
 int $a[5] = \{0\}$
 $a[0] a[1] a[1] a[1]$
 $a[0] 0 0 0 0$

y Initialise without size.

Gu ànt al] =
$$\{1,2,3\}$$

$$-a[0] a[1] a[2]$$

$$1 2 3$$

* Runtime:

```
* Write a C program to read and display that con
                                                    write a c program
      of 1-Darray.
                                                   in the list.
                                                    # include 25tdio.h
     #include estdio. h >
      int main()
                                                      int main ()
                                                         int aczoJ, m.
         int a[20], n, 1;
                                                         PrintfC.Ent
         Printf("Enter the array size");
                                                         scan + ("1.d.
1) :
         scanf ("1.d", En);
                                                          printfl"in
                                                          for liso; 14
         Printf ("In Enter elements:");
                                                           scan + ("1.0
         for ( i= 0; i < n; i++)
                                                          Print + C"In
         scanf("1.d", & a[i];
                                                           for ( := 0;
        Printf ("In The Clements are:
        for (1=0; 12n; 1++) 000 10 A Free 321 15
                                                           Printflui
                                                            min = max
        Printflood", ali];
                                                            forliso
        return o;
                                                                ifa
* Write a C program to find the sum and average inthe
                                                                 mir
1ist of elements.
                                                                 if C
#include c stdio. h >
                                                                  ma
int main ()
                                                              Printf
  inta[20], n, 1, 5=0;
   Print f ("Enter the array size");
                                                                retu
   scanf ("1.d", &n);
   Printf("In Enter elements: ");
   tor(i=0; (in; i++)
  scanf("(.d", & a [ i]);
  frint + (" In The elements are : ");
  for (i=0; iin; i++)
 Print + ("1-d", ali]);
 tor(1=0; 12n; i++)
 5 = 5 + a[i];
Printf ("Sum = f.d In Average = 1. t", safloat (s/n) not
```

```
* Write a Cprogram to find minimum and maximum
in the list.
 # include ¿sidio.h >
  int main ()
    int a[20], n. i, min, max;
    Printf('Enter the array size");
    scan f ("1.d", &n);
     Printfl"In Enter elements: 1);
     forliso; izn; i++)
    scan f ("1.d", & a [i]);
     Print + ("In The elements are: ");
     for (i=0; i 2 m; i++)
     Printf("1.d", a[i]);
     min = max = a [o];
      for (i=0; 1 Ln; 1++)
        if(a[i] Lmin)
         min=ali);
                    asial amenyone equations
         if (a[i] > max)
         man=a[i];
      Printfl"Minimum element = 1.d In Maximum
                   element = 1. d", min, mon);
       return 0;
                             IR WOOD LINES!
```

37nt a[2][3]. (* 2-D Array: 7 mr a[][3] = [10 array variables store a list of values only by there could be a situations where a table of value have to be stored which need 20 arrays. * Runtime-, In Ex. 1) Periodic table for (i=0; ic) 2) Sales information of a company 3) Data in spread sheets etc. for(j=0; j -) The two dimensional (2D) array in c programming scanf (" is also known as matrix. A matrix can be represented as a table of rows and columns. A * Write a Cprc Particular value in a matrix can be accessed by 2-Darrays. using two subscripts such as vis here v denotes the # include 25t entire matrin and vij refers to the value in the ith int main (now and ith column. An array of arrays is knownas Q-D array. int alfol * Declaration of &-Darray: Print fl scant (Syntax. Print fl datatype array nome [size 1] [size 2] for (i= e_{n} int a[10][10]* Initialisation of 2-D arrays: There are & types 1) Compile time 2) Runtime * Compile time: Print. The different ways of initialising in compile time are as follows. → int a[2][3]= {1,2,3,4,5,6}; → 1 2 3 4 5 6. >int a[2][3] ={{1,2,3}, {4,5,6}}; → 1 2 3 sint a[2][3] . {1,2,3,43; 1 2 3

for

5 ca

tor

ret

```
> 9nt a[2][3]= {{1,2,8}, {4,5}};
> Inta[][3] = (1, 2, 3, 4, 5);
 * Runtime- Pultialisation!
   Sor (i=0; ier; i+t)
      for(j=0;j2c;j++)
      scanf ("1.d", &a[i][i]);
 * Write a c program to read and display content of
   2-Darrays.
  #include ¿stalio.h >
   int main ()
     int a[5][5], r, c, i, j;
     Printfl" Enter the order: ");
     scan f ("1.d", & r, & c);
     Print f ("Enter the elements: \m");
      for ( i= 0; 12 r; j+t)
         for (j=0; j < c; j++)
         scanf ("1.d", & a [i][j]);
      Printfl" The elements are : (n ");
        for (1=0; (2 x; i++)
         torlj=0; j c c; j++)
         Printfl'/d'", a [i][i]);
         Printf("\n");
       return o;
```

```
* Write a C program to implement matria transpore.
 #include cotdio.h>
 int mount)
    inta[5][5], r, c, i, 1;
    Printf. (" Enter the order: ");
    scan & ["T.d Y.d", & m, & c);
    Printfl" Enter the elements: \n");
    for (1=0; izr; 1++)
    for(j=0; j < c; j++)
       scanfl" 1.d", & a[i][j]);
     7
    Printfl" The elements are: In");
     for (i=0; izr; i++)
       for (j=0; j < C; j++)
                       This or Tallate is
       Printfi".d", alistis);
      Printfl" The transpose is: \n");
      tor(120; 120; 1++)
        torlj=0;jl~;j++)
         Printfl"T.d,", a [1][i]);
         Printf ("Im")
       return 0;
```

* Multi-Di

Callows ?

limit 15 C

Syntax

type-ar

where

egi int

A 3D

array

and a

initio

* Multi-Dimensional Array: Callows rays of three or more dimensions. The exact

limit is determined by the compiler.

Syntanio type-array-name [51] [52] [53] .-- [5m]; where si is the size of the ith demension.

eg. inta[3][3][3]; int b[5][4][5][3];

A 3D array is essentially an array of arrays of arrays: it's on array or collection of a Darrays and a Darray is an array of 10 array. initializing 3rd array: Reading and waiting strings

sulfined strings todestys a particular to anothering Wallents top & branche bu

Primis ale vertical a

- Congras