**POINTERS IN C**

**its hold address of another variable with block of symbol \***

* BASICS
* APPLICATION OF POINTER

**BASICS:**- **X name of memory block variable**

Simple declaration int x=5;

5

J contant memo.block

main()

2048

{

Int x=5; Memo.blo. ka address

Printf(“%d\n”,x);

Printf(“%d”,&x); output 1 printf me 5 me 2048 aaya…

Ye address jaanne ka program tha.

Scanf me & karte the, par isme likh rahe he iska matlab y ek operator he jisne x k address ko return kiya h.

* & is a knows as address of operator.
* It is an unary operator.
* Operands must be the name of variable x(operands )
* & operator gives address number of variable.

(&X ) isliye printf me address de raha tha to isko refrencing address bhi bolte he.

**INDICATOR OPERATOR**

Also known as de-refrencing operator.

It is also unary operator

**Now we have to learn difference b/w refrencing and de-refrencing operators**

REFRENCE

&

& variable name ye apko address deta he

DE-REFRENCE

Aap isko

Variable ka address

Do to ye variable dega

\*&x

Program using indirector operator

Main()

{

Int x=5;

Printf(“%d\n”,x);

Printf(“%d”,&x); garbezzzz

Printf(“%d”,\*&x);

}

3 wale printf stmt me 2 unary operators lage he, pahle &x solve hoga kyki unary operator right to left work karta he…..&x solve hone k baad apko milega 2048 jisse hum \*2048 manenge. 2048 addresss he or \* lagate he ye variable ban gaya, matlab 2048 kiska address h x ka h.. to output hoga……….

5

2048

5

%d= -32768 to 32767 numbers printf karwa pate h, par address numbers 0 se65535 me hote he. Isliye %d ki jagah easily %u bhi use karna jyada better he…..

Ab 1 sawal solve karte h……….. maan lo

X

int x=5; diagram

5

&x=7;

2048 Memory block address

Matlab x naam ka variable he jiski value 5 he, ye to clear he ki y memory block address h jiska address 2048 mana hua h, apne likha h **&x=7; iska matlab kya hoga ?**

&x (assign)=7; ka matlab address of x me 7 assign karo,sawal right hoga?

Ager apko lagta h ki 7 x me chala jayga to y wrong he kyki humne address of x assign 7 nahi likha h. or ager hum &x=7 likh rahe he to ye actual me error hue……..

Assignment k left hand side par kabhi constant nahi ho sakta,or address of x likhna 2048 likhne k barabar h….

We cant store anything in &x as &x is not a only variable, it’s a way to represent address of block x,

Kabhi bhi assignment se phle constant nahi likhna he. Kyki constant me kuch assign nahi ho sakta, variable me ho sakta h. so it is error &x=7;

Lekin assignment par right side par constant likh sakte he jese….

Int x=5; // X

J=&x; // 5

// 2048

J assign right side me likha he &x; matlab we can store address in another variable but j has to be declared before use.

j5

X5

55

20485

To address ko kisi variable me rakh sakte he par declaration karna padega, par declaration karte h to y method wrong he.. kyki 2048 bhi 1 no. he jo j ke ander he to x or j dono ki value in the to hume compiler ko y batana padega ki 5 ek ordinary in the,jabki 2048 ek address he

Complier ko batana hoga ki j ko address block mana jaye or x ko value..

Isliye jab bhi hum j ko declare karenge to \* symbol lagaynge.

Int x=5;

j5

X5

Int \*j;

J=&x;

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Isse clrear ho gaya ki ye j variable address contain karne k kiye banaya gaya he. To ab hum j me koi ordinary value nahi rakh sakte,sirf addresss he rakh sakte he jese X

Means

* J is not an ordinary variable like another int variable.
* J is a pointer here for contains addresss of another variable
* Pointer always consumer 2 bytes in memory …

**One more question we have to solve for consider a pointer….**

Main()

j5

X5

{

20485

55

Int x=5,\*j;

J=&x;

Printf(“%d%u\n”,x,j);

Printf(“%d%u”,\*j,&x);

Printf(“%u”,\*&j);

}

1). printf me first x or j ki value print ho rahi h..

2) printf me j nahi \*j likha hua h to yaad rakhe j ka matlab 2048 or pahle \* laga dene ka matlab he \*2048 or \* matlab indirector operator jab bhi apply hota h kisi bhi operator k address wale block ko represent karne lagta he yani x..

\*j as good as x

Sath he &x to print hoga or x ka address read karega address of x matlab 2048….

3) printf me ek baat yaad rakho jab bhi \*& sath ho to cancle kariye matlab only j printf hoga jo ki address of block he.

Then finally output will be 5 2048

5 2048

2048

**BASE ADDRESS CONCEPT IN POINTER……..**

**jab bhi hum address kisi pointer me rakhte he to base address he pointer me jata he…**

**for example :-**

Aap yaha 3 declaration or 6 variables dekh rahe h…to bataiye kisko kitni memory milegi?

Kyki teeno pointer variable he to inko 2 -2 byter consume hoti h

Int a,\*j; a ko 2 bytes //j ko 2 bytes

1000 1001

// k ko 2 bytes

// r ko bhi 2 bytes

float b,\*k; b ko 4 bytes

2000 2001 2002 2003

char c,\*r; c ko 1 byte

3000

isko briefly smjhte he, jab a ki baat karnge to 2 bytes matalb 2 address honge, 1000,1001.

B ke 4 variable means jitni bytes honge utni he memory consume hogi. Pahle bite ko base address kehte he. A ka base address 1000,b ka base address 2000 or c ka base address 3000..

Phle humne bola ki jab hum addresss kisi pointer me rakhte he to base address represent hote he pointer me jata h jese……

J=&a;k=&b;r=&c; ko smjhe to..

J me // a ka base address gaya

1000

K me // b ka base address gaya

2000

r me // c ka base address gaya..

3000

matlab \*j=a,\*k=b,\*r=c;

jese pointer ka data type uske size par asar nahi dalta lekin us pointer me kis variable ka address assign ho sakta h, is baat par jarur asar daalta h..

jese ager pointer variable float data type ki help se bana he,jese yaha k he, to only float variable ka he address contain kar sakta he..

iska karan ye he ki pointer jis type ka hota he usi type ke block ko represent karta h kyki k me 2000 he to y kese pata chalega ki 2000 k baad 2001 bhi h ya 2002 bhi h. kyli y k ki responsibility he ki floay value ko represent karne ki bajaye int value he access karega……………..

is tatah se aap pointer ko bhut easily way me smjh sakte h……

wap To display array elements with the help of pointer.

Void main()

{

Int a[]={10,20,30,40,50};

Int \*p;

Int i;

P=a; // as same p=&a[0]

For(i=0;i<=4;i++)

{

Printf(“%d”,\*p);

P++;

}

Printf(“\n”);

}

If we want to revrese print values like 50,40,30,20,10 then only 2 condirions here we can modify.

P=a; ki jagah p=&a[4];

P++ ki jagah p--;

2.WAP TO FIND BIG NUMBER AND POSITION USING OF POINTER…

Void main()

{

Int a[10],n,i,big,pos;

Printf(“enter numbers of elements\n”);

Scanf(“%d”,&n);

Printf(“enter the elements\n”);

For(i=0;i<=n-1;i++)

Scanf(“%d”,a+i);

Big=\*(a+0);

Pos=0;

For(i=1;i<=n-1;i++)

{

If(\*(a+i)>big)

{

Big=\*(a+i); \*i

Pos=i;

}

}

Printf(“largest=%d\n”,big);

Printf(“positions=%d\n”,pos+1);

}

So output will be

Enter number of elements 2

Elements

54

45

Big 54 and position 1st

**wap to add two numbers using pointer..**

Main()

{

Int a=10,b=20,sum; /variable

Int \*pa,\*pb; //pointer intiaalization

Pa=&a; x \*j=&a //its not a base address it pre inti..pointer ko

Pb=&b;

Sum=\*pa+\*pb;

Printf(“sum=%d\n”,sum);

}

WAP SWAP ANY TWO NUMBERS WITH POINTER AND CALL BY ANOTHER FUNCTION USING (VOID)…

#include<stdio.h>

Void swap(int \*,int \*);

Void Main()

{

Int a,b;

Clrscr();

Printf(“enter two numbers a and b “);

Scanf(“%d%d”,&a,&b);

Swap(&a,&b);

Printf(“a[%d] b[%d]”,a,b);

Getch();

}

Void swap(int \*x,int \*y)

{

Int t;

t=\*x;

\*x=\*y;

\*y=t;

}

WAP TO USE ARRAY IN POINTER?.. (char) type \*\*\*\*\*\*\*

#include<stdio.h>

Main()

{

Char \*ptr[]={“January”,”febuary”,”march”,”april”,”may”,”june”,”july”,”auguest”,”September”,”octomber”,novermber”,”December”};

Int i;

For(i=0;i<12;i++)

{

Printf(“month[%d]: %s\n”,(i+1),ptr[i]);

// array elements ko pointer me use krte he to…

}

}

WAP TO DESCRIBE POINTER TO POINTER?( \*\*\*\*\*\*)

#include<stdio.h.

#include<conio.h>

Int main()

{

Int x=10; //constant

Int \*p; //1st pointer

Int \*\*q; // 2nd pointer

P=&x;

q=&p;

printf(“x value is%d\n”,x);

printf(“address of x is%u\n”,&x); //%d change krkr dekho

printf(“the value of p is%u\n”,p);

printf(“address of p is%u\n”,&p);

printf(“the value of pointered by the pointer p is %d\n”,\*p);

printf(“the value of q is%u\n”,q);

printf(“the address of q is %u\n”,&q);

printf(“the value of x by using pointer to a pointer q is %d”,\*\*q);

getch();

return(0);

}

**STRUCTURE IN C [use DEFINE data types]…**

* Structure is a way to group variables.
* Structure is a collection of dissimilar elements.
* Defining structure means creating new data types

Set of records 1 user define data types me use karne ka matalb structure

Jese hum jante he data types 2 type k hote h.. primptive d.t or non primptive d.t

Primptive ka matlab jese[int,char,float,double] single value he hum store kar paynge means(fundamental data ) .but ager apko student ki details store karni h to yaha apke pass esa koi variable yaha primitive me nahi hoga jo y work kar sake..

Aap ab y soch rahe honge ki hum alag alah variable bhi to bana sakte h ..pr apko kese pata chalega ki itne sare data types me se students details ya records ka data kin variables k set me rakha hua h ..

Isliye user define d.t ki help se y kaam ham kar sakte h …for example…

Jese structure ka use karke kuch variables milake students ki drtails store kar sakte h, kuch variables milakr customer ki details store kar sakte h…. structure hume wo tarika deta he jisse hum alag variables ki grouping kar sakte h…etc..

//atomic data types isme single value store krte the

Par ager hume student ki details store karni h to 1 variable se kaam nahi chalega.

To hume kais are variables banana padenge kisi me int k value ,kisi m float ki value kisi me char ki value hogi….

non primitive

(User defined d.t)

Y sare alag type k variables ek unit k roop me kaam karenge.

Syntax :

Struct (tag) //yaha wo naam likhna h jo ab se int ,float ki tarah apka data type hoga.

{

// members variables declarations here

};

For example ager date ki information store karni h to….

Struct date // data likha he kyki information data ki store he.

{

Int d,m,y; //all element same h

};

Isse kitni memeory consume hue?

Ager apko lgta h ki par byte k according 2+2+2 byes =6 to y wrong h kyki no ,memory is consumed for defined a structure..kyki ager aap predefine data types ka declaration karte h to compiler y janta he ki float ya int ko kitni memory consume hue jese

Void main()

{

Float x; 4 byte consumed because of variable x used.

ya float x,y;

Wo bhi tab jab humne koi variable assign karwaya ho kyki memory kabhi bhi data types me consume nahi hoti uske sath declare kiye gaye variable me consume hoti h.

Float phle se bana data type tha to hume define nahi karna pada par data ya student phle se bana hua datatype nahi tha to date ko humne define kiya

To define karne se koi memory consumw hogi..

Jab hum variable banayge to memeory consume hogi ab compiler ko ab y pata chal gaya h ki date ya students bhi ab char,float,int ki tarah data types h..

Ab y smjhte he ki y jo structure define kiya gaya he y kaha kaha use kiya ja sakta h?

Y function ki body k baher bhi hota h or ander bhi jese

Struct date

{

Int d,m,y; //all element same h

};

Ager y main function k baher aap define karenge to y global declaration hua means date word ab pure program me pehchana jaga. Pr y structure ager kisi function ki body k andre part me hue to

Jese

Void main()

{

Struct date

{

Int d,m,y; //all element same h

};

} //Main body closed

To ab y jo date d.t define kiya kisi bhi function me to y local definition matlab kisi function k structure k liye h isko pehchana jaye..

To y hua global declaration of struct..or local declaration of structure..

Ab y dekho ki strucuter ka variable kese declare hoga…

Struct date

{

Int d,m,y;

};

Void main()

{

Struct Date today; // jese float x; declare krte the wese he user define data data type me today naam ka variablr declare kr liya….

Lekin 1 rule h c me ki jab bhi aap struct keyword k through banaya gaya data type ke har use me apko datatype se phle struct keyword ka use karna padega.. today to 6 bytes consume ho rahi h..

Abhi y variable function k ander banaya to y local variable h matlab y bas main function me h access hoga..

Lekin ager hum main k phle

Struct date d1;

today

Void main()

{

Y

M

D

To y global declaration hua…

Students ki details rakhne k liye?

Struct student //user define

{

Int roll no; // diff types of element

Char name[20];

Int age;

};

WAP to access various members of structure?

#include<stdio.h>

Struct stud

{

Int rno;

Char name[20];

};

Main()

{

Struct stud s;

Printf(“enter the student’s name”);

Scanf(%s”,s.name);

Printf(“enter the student’s of roll number”);

Scanf(“%d”,&s.rno);

Printf(“the student’s details are\n”);

Printf(“name: %s\n”,s.name);

Printf(“roll no: %d\n”,s.rno);

}

Getch();

}

Output

Enter students name ……….

Enter students roll no …………

The students details are :

Name ….

Roll no. ….

**WAP STRUCTURE TO pointer ……………. \*\*\*\***

#include<stdio.h>

#include<conio.h>

Struct student{

Char name[15];

Int rollno;

};

Int main() // should return any value

{

Struct student anil;

Struct student \*ptr;

Strcpy(anil.name,”anil”); // string ka function

Anil.rollno=1234;

Ptr=&anil;

Printf(“%s\t%d\n”,anil.name,anil.rollno);

//we can use -> arrow operates to access memebers of pointer we can use in structure…..

Printf(“%s\t%d”,ptr->name,ptr->rollno);  
getch();

Return 0;

}

**Wap to using structure with array**

#include<stdio.h>

#include<conio.h>

Char name[15];

Int rollno;

};

Int main()

{

Int size=3; //we can use 3 students as s array elements.

Struct student s[size];

Int counter;

For(counter=0;counter<size;counter++)

{

Printf(“enter the name and roll no of students %d”,counter+1);

Scanf(“%s%d”,&s[counter].name,&s[counter].rollno);

}

Printf(“\n\n”);

For(counter=0;counter<size;counter++)

{

Printf(“name %s\t rollno %d\n”,s[counter].name, s[counter].rollno);

}

Getch();

}

Question how to create nested structure where we learn that how we can one structure call members of another structure

Like if we want to give details of a students name,date of birth,marks of three subjects,and find average of three subjects..

#include<stdio.h>

#include<conio.h>

Srtuct date

{

Int dd;

Int mm;

Int yy;

};

Struct stud

{

Char name[20];

Struct date d;

Int m1,m2,m3;

Float per;

};

Main() //local

{

Struct stud s;

Printf(“enter the details of student\n”);

Printf(“\nname”);

Scanf(“%s”,s.name);

Printf(“\ndate of birth (dd mm yy)”);

Scanf(“%d%d%d”,&s.d.dd,&s.d.mm,&s.d,yy);

Printf(“\nmarks in 3 subject”);

Scanf(“%d%d%d”,&s.m1,&s.m2,&s.m3);

s.per=(s.m1+s.m2+s.m3)/3;

printf(“\nstudent result”);

printf(“\n%s has secured %f%%”,s.name,s.per);

getch();

}

**UNION IN C**

* Union is similar to structure,except it allows you to define variables that share storage space.
* Defining union means creating new data type

**What is the difference between structure & UNION?**

union item

{

Int x;

Float y;

Char z;

};

union item i1;

Struct item

{

Int x;

Float y;

Char z;

};

Struct item i1;

I1

y

z

x

Yaha structure me collection of non similar all data types he but union me yaha memory waha allocate hogi jaha sbse bada bytes h .. means yaha union me jo sbse bada h usi ko memeory allocate hogi ….

Isliye union memory efficient he pr y har jagah kaam nahi aata…for example ager apko koi database create karna h to all members of students use honge matlab structure ka use hoga..

Or dusre program me ager aapko user se data lena h.or wo data int ho ,float hoy a char ho teeno me se kya hoga apko nahi pata.teeno me se koi bhi ho sakta he to aap banayge union…

Union banana se faayda y hoga aapki memeory block ki bachat hogi.jitna memory block bana rahe he jitna member ka size he..

Jese ager int ko block allocate hua to 4 byte k block me 2 byte or char hua to ¼ part or float hua to full memeory allocated hogi..

Syntax

Union item

{

Int x; float y; char z;

};

Void main()

{

Union item i1;

Clrscr();

I1 x=5; //int

Printf(“\n%d”,i1.x);

I1.y=3.5; //float

Printf(“\n y=%f”,i1.y);

I1.z=’a’; //char

Printf(“\n %c”,i1.z);

Getch();

}

**WAP FIND DIFFRENCE BETWEEN STRUCTURE AND UNION?**

#include<stdio.h>

#include<conio.h>

Int main()

{

Struct person //user define d.t

{

Int age;

Char name[6];

Float height;

};

Union student

{

Int age;

Char name[6];

Float height;

};

Printf(“%d\n”,sizeof(struct person));

Printf(“%d\n”,sizeof(union student));

Getch();

Return 0;

}