

C Language LIVE Community Classes

Pointers

Day-18

By

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Introduction

int $x = 5;$



5 printf("%d", x);

1000 ← address reference

whole numbers

1000 printf("%d", &x);

5 printf("%d", *&x);

$*\&x \approx x$

*

&

- address of operator
- referencing operator
- unary operator
- $\&$

$\& \leftarrow$
variable

variable → $\&$ → address

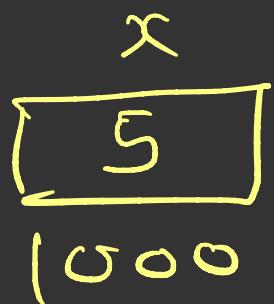
- Indirection operator
- Dereferencing operator
- unary operator
- $*$

$* \leftarrow$
address

address → $*$ variable

int x = 5;

&x = 7;



→ Error

$\&x$ is just a way to represent address of variable x . $\&x$ is treated as a constant.
 $\&x$ is not a variable

Constant =

error

error

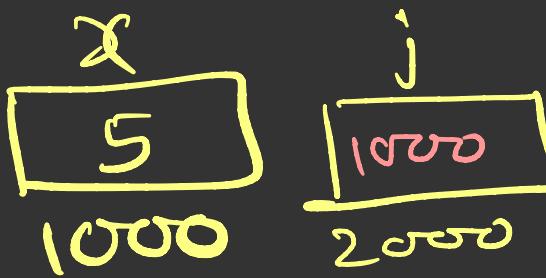
char str[10];

str = "BHOPAL";

↑
address

strcpy(str, "BHOPAL");

```
int x=5;  
int *j;  
j=&x;
```



```
printf("%d %d %d", j, &x, x);  
      1000 1000 5  
      5     5   2000  
printf("%d %d %d", *j, *(&x), *(&j));
```

j is a pointer variable



What is Pointer?

A pointer is a variable which contains address of another variable.

int *P;

P = &x;

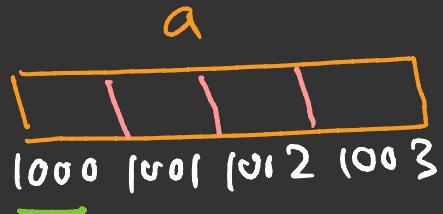


P points to x

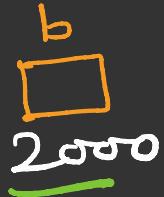
P vs *P

$*P \approx x$

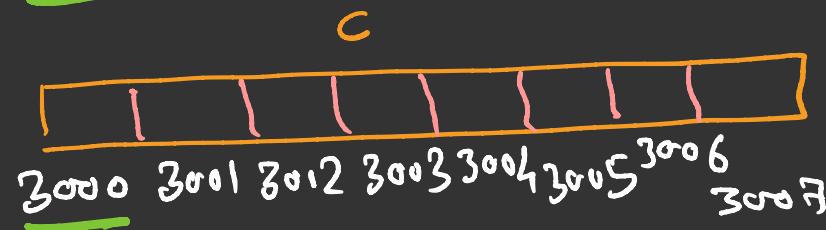
int a, *p;



char b, *q;



double c, *r;



P = &a; Base address

$\&a \rightarrow 1000$

$\&b \rightarrow 2000$

$\&c \rightarrow 3000$

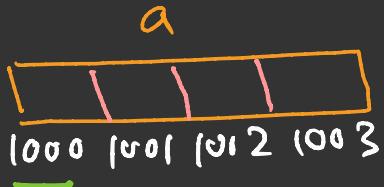
8 bytes

ordinary variable का size उसके datatype पर depend करता है।

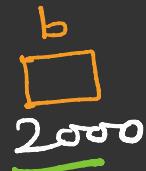
Pointer variable का size उसके data type पर depend नहीं करता।

pointer variable always contains base address.

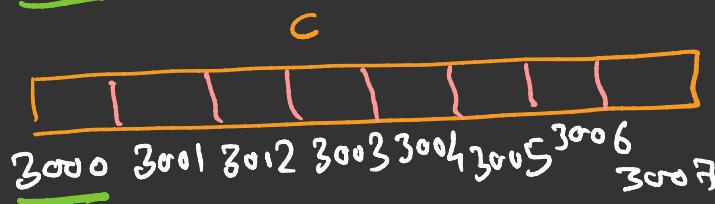
int a, *p;



char b, *q;



double c, *r;

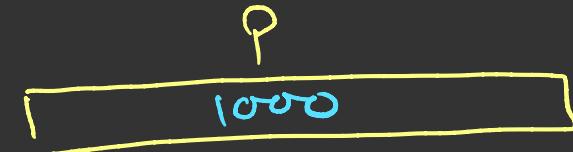


P = &a;

*P = 4;

q = &b;

r = &c;



P = &b;
*P = 5;

P
[2000]

wrong

Extended Concept of Pointers

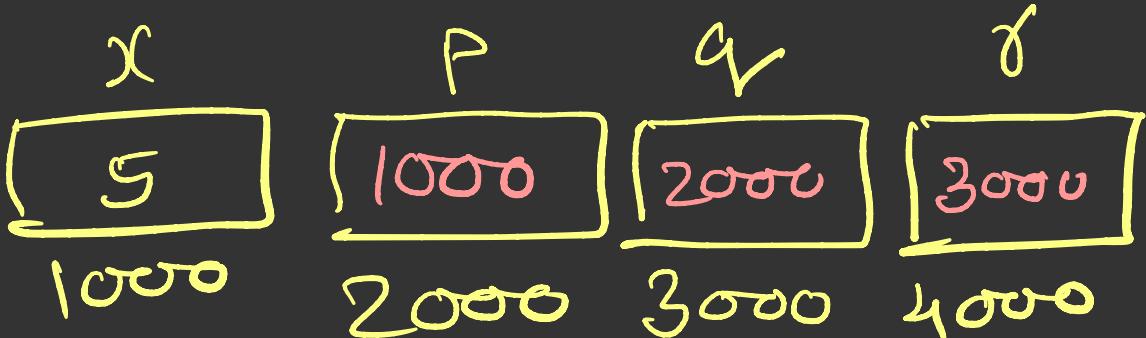
int $x = 5;$

int *P, **q, ***s;

P = &x;

q = &P;

s = &q;

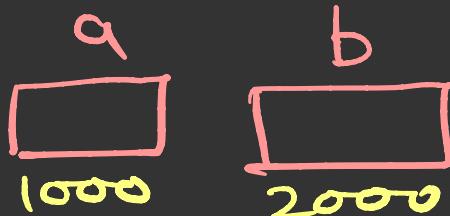


Pointer's Arithmetic

```
int a, b, *p, *q;
```

```
p = &a;
```

```
q = &b;
```

 $p+1 \quad 1004$ $p+2 \quad 1008$ $p+5 \quad 1020$ $p-2 \quad 992$ $p-3 \quad 988$

$p+q$
 $p*q$
 p/q
 $p*5$
 $p/4$

error

 $p+2$ $p-3$ $q-p$ $q-p$ 250

```
void swap( int *, int *);
```

```
int main()
```

```
{
```

```
    int a,b;
```

```
    printf("Enter two nos");
```

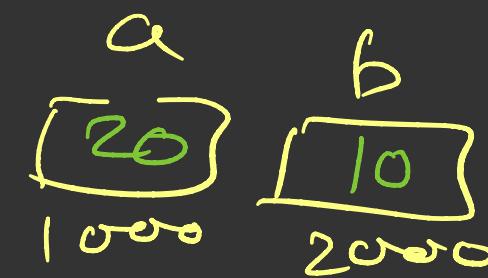
```
    scanf("%d%d", &a, &b);
```

```
    swap(&a, &b);
```

```
    printf("a=%d b=%d", a, b);
```

```
    return 0;
```

```
}
```



```
void swap( int *P, int *Q)
```

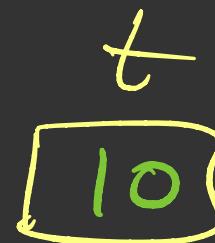
```
{
```

```
    int t;
```

```
    t = *P;
```

```
    *P = *Q;
```

```
    *Q = t;
```

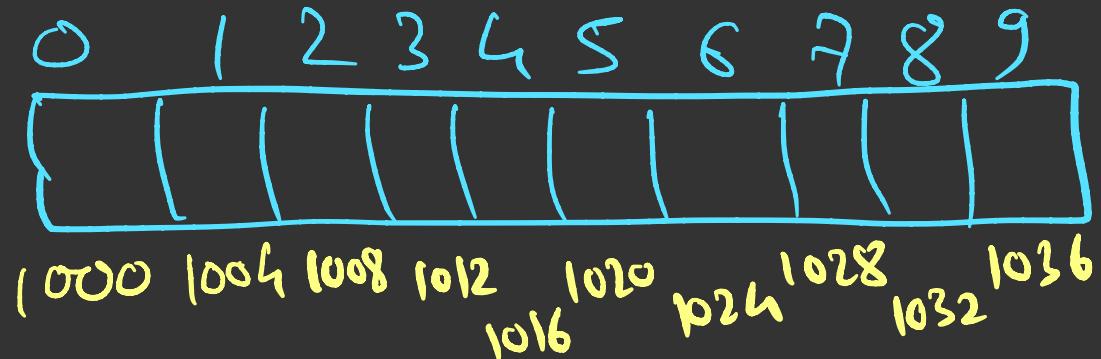


```
}
```

Pointers and Arrays

```
int a[10];  
int *p;  
p = &a[0];
```

p
[row]



$$*(p+0) \approx a[0]$$

$$*(p+1) \approx a[1]$$

$$*(p+i) \approx a[i]$$

$$p[3] \approx a[3]$$

$$p[3] \quad a[3]$$

$$*(p+3) \quad *(a+3)$$

$$*(1000+3) \quad *(1000+3)$$

$$*(1012) \quad *(1012)$$

$a = ?$ ✗

$p = ?$ ✓

Pointers and Strings

int l;

char str[20] = "Bhopal";

l = length(str);

int length(char *p)

{

int i;

for(i=0; p[i]; i++);

return i;

}