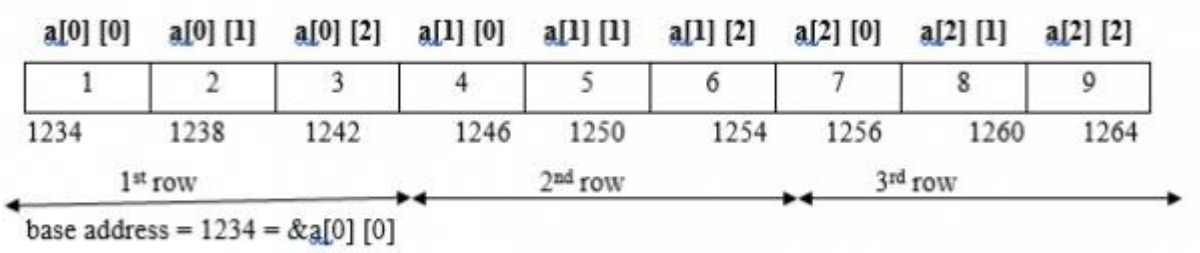
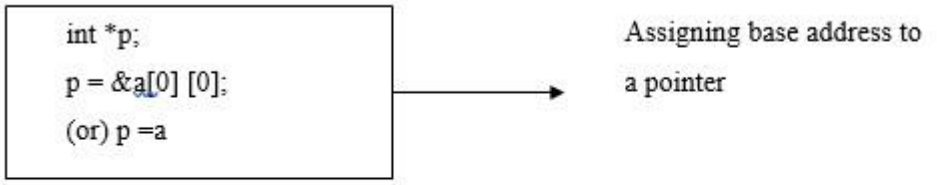
Pointers and two dimensional arrays

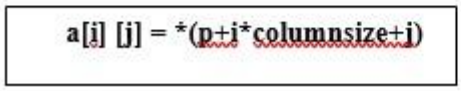
Memory allocation for a two-dimensional array is as follows −

```
int a[3] [3] = {1,2,3,4,5,6,7,8,9};
```





❖ Pointer is used to access the elements of 2 – dimensional array as follows




```
a[1] [2] = *(1234 + 1*3+2)
= *(1234 + 3+2)
= *(1234 + 5*4) // 4 is Scale factor
= * (1234+20)
= *(1254)
a[1] [2] = 6
```

Example

Following is the C program for pointers and two-dimensional array −

```
#include<stdio.h>
main ( ){
   int a[3] [3], i,j;
   int *p;
      printf ("Enter elements of 2D array");
   for (i=0; i<3; i++){
      for (j=0; j<3; j++){
         scanf ("%d", &a[i] [j]);
```

```
      }
   }
   p = &a[0] [0];
   printf ("elements of 2d array are");
   for (i=0; i<3; i++){
      for (j=0; j<3; j++){
         printf ("%d \t", *(p+i*3+j));
      }
      printf ("\n");
   }
   getch ( );
}
```

Output

When the above program is executed, it produces the following result −

```
enter elements of 2D array
1 2 3 4 5 6 7 8 9
Elements of 2D array are
1 2 3
4 5 6
7 8 9
```