Programming in C

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Initializing 2D Arrays

A 2D array is declared as follows:

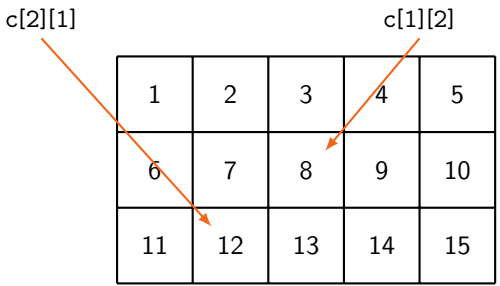
```
#define ROWS 3
#define COLS 5
int a[ROWS][COLS];
```

2D array initialisation :

```
int b[2][3] = {1, 2, 3, 4, 5, 6};
int b[2][3] = {{1, 2, 3}, {4, 5, 6}};
int b[ ][3] = {{1, 2, 3}, {4, 5, 6}};
```

Although 2D arrays are stored in a contiguous block of memory, we may think of them as a 2D rectangle of data.

```
int c[3][5] = {{1,2,3,4,5}, {6,7,8,9,10},
               {11,12,13,14,15}};
```



2D Distance

```c
#include <stdio.h>
#include <math.h>

#define   M   7
#define   N   9

int main(void)
{
   int   a[M][N];
   double x, y;

   /* fill array */
   for (int j = 0; j < M; ++j){
      y = ((double)j - ((double)(M-1)/2.0));
      for(int i = 0; i < N; ++i){
         x = ((double)i - ((double)(N-1)/2.0));
         a[j][i] = round(sqrt(x*x + y*y));
      }
   }

   for (int j = 0; j < M; j++){
      for(int i = 0; i < N; i++){
         printf("%d", a[j][i]);
      }
      printf("\n");
   }
   printf("\n");

   return 0;
}
```

Execution :

```
544333445
443222344
432111234
432101234
432111234
443222344
544333445
```