

Handout 16

2D arrays

16.1 Warm up

```
/*  
how to declare an array with values in it  
*/  
#include <stdio.h>  
#include <math.h>  
#include <stdlib.h>  
  
int main()  
{  
    int list[5] = {3,5,7,9,11};  
    int k;  
  
    for(k=0; k<5;k++)  
    {  
        printf("%d ",list[k]);  
    }  
    printf("\n");  
}
```

16.2 2D arrays

How to store the following information?

ID	HW1	HW2	HW3	HW4	HW5	HW6
1357	4.0	3.7	2.0	3.7	4.0	2.0
2468	2.0	0.0	2.0	4.0	4.0	3.0
2354	3.7	3.3	2.3	3.5	2.0	3.0
9783	2.7	1.7	2.5	2.7	4.0	3.7

Use a 2D array!

```

/*
first pass at 2D arrays
*/
#include <stdio.h>
#include <math.h>
#include <stdlib.h>

int main()
{
    double grades[4][7] = {
        {1357,    4.0,    3.7,    2.0,    3.7,    4.0,    2.0},
        {2468,    2.0,    0.0,    2.0,    4.0,    4.0,    3.0},
        {2354,    3.7,    3.3,    2.3,    3.5,    2.0,    3.0},
        {9783,    2.7,    1.7,    2.5,    2.7,    4.0,    3.7}
    };

    printf("%lf\n", grades[2][3]);
}

```

- Other ways to fill the array?
- Other ways to display data?

16.3 Displaying data

In the code above, replace the line

```
printf("%lf\n", grades[2][3]);
```

with

```
printf("%g\n", grades[2][3]);
```

What does this do?

Now modify the program so that it prints out the whole table of grades. Make it look nice (to the extent possible)!

16.4 Computations with 2D arrays

1. Suppose we would like to know the class average for each homework assignment? Modify your code so that the table has an additional row along the top that shows the average.
2. We would also like to know the average grade for each student. Modify your code to include this information.

16.5 Filling 2D arrays

Finally, we want to modify the code so that the user can enter the grades. We assume that the user wants to enter the grades assignment-by-assignment. This means that the user will first enter all of the HW1 grades, then the HW2 grades, etc. Modify your program so that it prompts the user to enter in the grades in this way and then displays the table, including the averages.