

# Technical Informatics I

## Arrays in functions

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Technical Informatics 1: Dr Fatimah

# Arrays in functions

- Aims
  - Introduce and implement arrays in functions
- Expected Outcomes
  - Students are able to construct and implement numeric arrays in user-defined functions in their C programs
- References
  - Harry H. Cheng, 2010. C for Engineers and Scientists: An Interpretive Approach, McGraw Hill



# Content

- Arrays as function variables
- Function `plotxy`



# Arrays as function variables

- Passing arrays to a function
  - The name of the array must be specified without the brackets
  - The function needs the number of elements of the array
    - For example, if the declared variable is: `int A[24];`  
Then to pass into a function called `assignvals`:  
`assignvals(A, 24)`
- Function prototype

```
void assignvals( int a[], int arraySize );
```

  - Parameter names optional in function prototype
    - `int a[]` could be written `int []`
    - `int arraySize` could be simply `int`
    - `void assignvals( int a, int );`



# Arrays as function variables

## Example 1:

```
1  /*Lecture 9: Arrays*/
2  /*Example 3: Arrays as function variables*/
3  #include <stdio.h>
4
5  void assignvals(int A[], int NSIZE);
6
7  - int main(){
8      int NSIZE = 4;
9      int A[NSIZE];
10
11     assignvals(A,NSIZE);
12
13     return 0;
14 }
15
16 void assignvals(int A[], int NSIZE)
17 {
18     int i;
19     /*Assign user input to array*/
20     for(i=0;i<NSIZE;i++){
21         printf("Enter value for A[%d]= ",i);
22         scanf("%d",&A[i]);
23     }
24     return;
25 }
```

Function prototype

Declaration of Array

Function call

Passing an array into a function



# 2D Plotting Function: `plotxy()`

- `plotxy()` is a plotting function that has been defined in ChIDE
- To use `plotxy()` you need to specify the header file:  
`#include<chplot.h>`
- The prototype for function `plotxy()` is as follows

```
int plotxy(double x[], double y[], int n, char *title, char *xlabel, char *ylabel);
```

- 1<sup>st</sup> argument: Array x the x-axis data of type double
- 2<sup>nd</sup> argument: Array y stores the y-axis data,
- 3<sup>rd</sup> argument each array with n elements.
- 4<sup>th</sup> – 6<sup>th</sup> argument: Labels for title, x-axis, and y-axis respectively



# 2D Plotting Function: `plotxy()`

## Example 2:

Write a program to plot a sin-wave,  $y = \sin(x)$ , where  $0 \leq x \leq 2\pi$  with 100 points in between.

## Note:

To generate a linear array of data `x[i]` with the values from  $x_0$  to  $x_f$ :

```
for(i = 0; i <n; i++) {  
    x[i] = x0 + i*(xf - x0) / (N-1);  
    ...  
}
```



# 2D Plotting Function: `plotxy()`

## Example 2:

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

#define PI 3.1425

#define NUMPOINTS 100

int main(){
    double x[NUMPOINTS], y[NUMPOINTS];

    int i;

    double x0 = 0, xf = 2*PI;

    for (i=0; i<NUMPOINTS; i++){
        x[i] = x0 + i*(xf-x0)/(NUMPOINTS-1);
        y[i] = sin(x[i]);
    }

    plotxy(x, y, NUMPOINTS, "y = sin(x)", "x", "y" );
    return 0;
}
```

Need to include  
`#include<chplot.h>`  
to use `plotxy` function

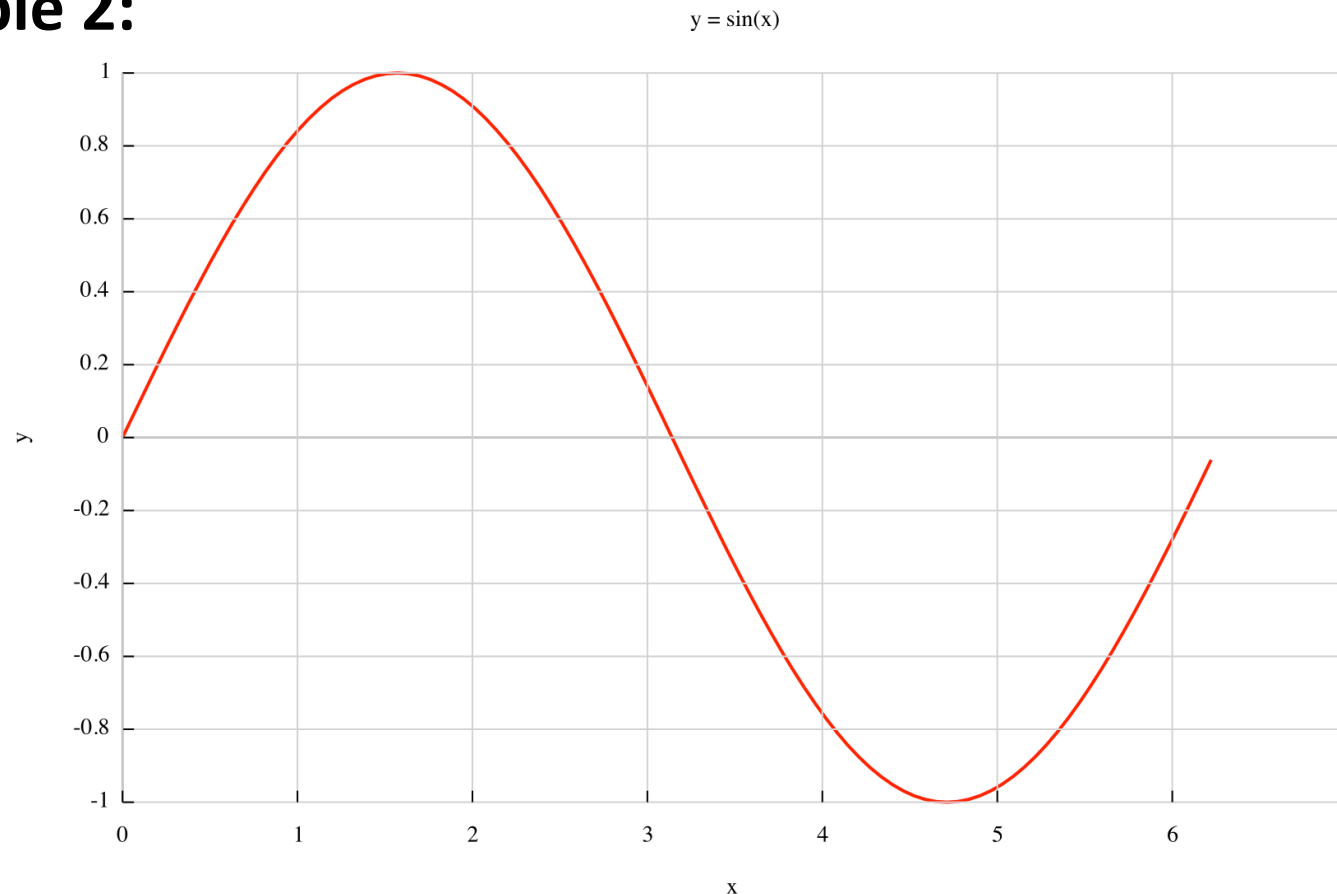
Generate linear data for x-  
axis

Plot `x` vs `sin(x)` using  
`plotxy()` function



# 2D Plotting Function: `plotxy()`

## Example 2:



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# Technical Informatics I

## Lecture 10

Dr Fatimah



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