

LED Light Shows

Generating Arbitrary Light patterns

- Beside counting or rotation that are math or control limited a more arbitrary pattern is possible using C Arrays with modulus look-up
- This is an exercise to do just such –again using PORTD LEDs

Arrays

How to Create an Array

Arrays are declared much like ordinary variables:

Syntax

```
type arrayName[size];
```

- *size* refers to the number of elements
- *size* must be a constant integer

Example

```
int a[10];    // An array that can hold 10 integers
char s[25];   // An array that can hold 25 characters
```

Arrays

Definition

Arrays are variables that can store many items of the same type. The individual items known as elements, are stored sequentially and are uniquely identified by the array index (sometimes called a subscript).

- **Arrays:**
 - **May contain any number of elements**
 - **Elements must be of the same type**
 - **The index is zero based**
 - **Array size (number of elements) must be specified at declaration**

Initialize Array

How to Initialize an Array at Declaration

Arrays may be initialized with a list when declared:

Syntax

```
type arrayName[size] = {item1, ..., itemn};
```

- The items must all match the *type* of the array

Example

```
int a[5] = {10, 20, 30, 40, 50};
```

```
char b[5] = {'a', 'b', 'c', 'd', 'e'};
```

How to use an array

Arrays are accessed like variables, but with an index:

Syntax

```
arrayName [ index ]
```

- *index* may be a variable or a constant
- The first element in the array has an index of 0
- C does not provide any bounds checking

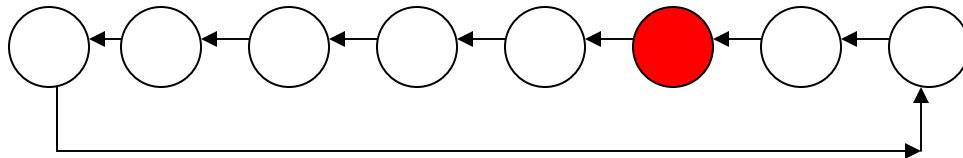
Example

```
int i, a[10];    //An array that can hold 10 integers

for(i = 0; i < 10; i++) {
    a[i] = 0;    //Initialize all array elements to 0
}
a[4] = 42;     //Set fifth element to 42
```

Exercise – Examine Rotate Via Lookup

- Use ARRAY to lookup and display arbitrary pattern
- Navigate to: C:\EET250\16F887\Lesson 6 Light shows with Demo Board\lightshow1
- Open Project lightshow1.mcp
- View code. All code is in place to do a emulate a rotate using fixed array size of const char LEDS[8]
- Build , program and run using PICKIT2 as debugger
- You should see the following light show. You can experiment with the delay function to speed up or slow down the rotate.



Exercise --Light Show

- Your turn take the lightshow1 code and modify it to achieve the following---Use ARRAY to lookup and display arbitrary pattern as shown
- Hint modify array values and array size, make sure the modulus check is correct for the new array size.
- Build, program, execute—demo to instructor

