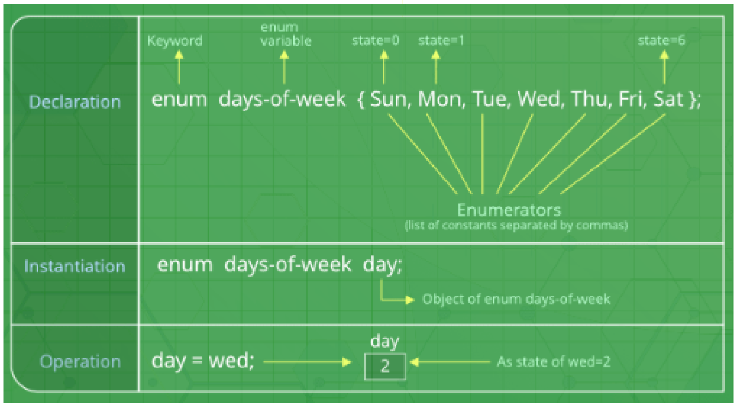
Enumeration (or enum) in C
Enumeration (or enum) is a user defined data type in C. It is mainly used to assign names to integral constants, the names make a program easy to read and maintain.



The keyword ‘enum’ is used to declare new enumeration types.

Variables of type enum can also be defined. They can be defined in two ways:

```
enum week{Mon, Tue, Wed};
enum week day;
// Or
enum week{Mon, Tue, Wed}day;
```

```
#include<stdio.h>
enum week{Mon, Tue, Wed, Thur, Fri, Sat, Sun};
int main()
{
    enum week day;
    day = Wed;
    printf("%d",day);
    return 0;
}
```

Output:

```
 2
```

```
#include<stdio.h>
enum year{Jan, Feb, Mar, Apr, May, Jun, Jul,Aug, Sep, Oct, Nov, Dec};
int main()
{
   int i;
   for (i=Jan; i<=Dec; i++)
      printf("%d ", i);

   return 0;
}
```

Output:

```
0 1 2 3 4 5 6 7 8 9 10 11
```

Facts about initialization of enum.

1. Two enum names can have same value. For example, in the following C program both ‘Failed’ and ‘Freezed’ have same value 0.

```
#include <stdio.h>
enum State {Working = 1, Failed = 0, Freezed = 0};

int main()
{
  printf("%d, %d, %d", Working, Failed, Freezed);
  return 0;
}
```

Output:

```
1, 0, 0
```

2. If we do not explicitly assign values to enum names, the compiler by default assigns values starting from 0. For example, in the following C program, sunday gets value 0, monday gets 1, and so on.

```
#include <stdio.h>
enum day {sunday, monday, tuesday, wednesday, thursday, friday, saturday};

int main()
{
   enum day d = thursday;
   printf("The day number stored in d is %d", d);
   return 0;
}
```

Output:

```
The day number stored in d is 4
```

3. We can assign values to some name in any order. All unassigned names get value as value of previous name plus one.

```
#include <stdio.h>
enum day {sunday = 1, monday, tuesday = 5,
          wednesday, thursday = 10, friday, saturday};

int main()
{
   printf("%d %d %d %d %d %d %d", sunday, monday, tuesday,
           wednesday, thursday, friday, saturday);
   return 0;
}
```

Output:

```
1 2 5 6 10 11 12
```

4. The value assigned to enum names must be some integral constant, i.e., the value must be in range from minimum possible integer value to maximum possible integer value.
5. All enum constants must be unique in their scope. For example, the following program fails in compilation.

```
enum state  {working, failed};
enum result {failed, passed};

int main()  { return 0; }
```

Output:

```
Compile Error: 'failed' has a previous declaration as 'state failed'
```