c language review

- linked list
  - a set of data structure (nodes) that contain reference to other data structures
  - llinked list vs arrays
    - linked lists can grow and shrink as needed, array has fixed size
    - linked list can insert a node between other nodes easily
- queue
  - a FIFO data structure
- arrays
  - array name holds the starting addr of the array
  - array name can be used as a ptr (a constant ptr)
  - ptr can be used as an array name
- pointers
  - declaring a C variable allocates a number of memory cells(bytes) and assign them a name

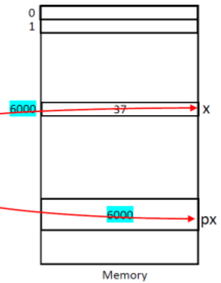
Pointers – The address of operator &

- You can access the address of a variable using the & operator, e.g.

```
char x = 37;
char *px;
px = &x
```

In the above example:

- & is the address-of operator
- char* is the declaration of a pointer

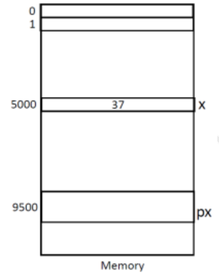


Pointers - Example:

```
int x = 37;
px = &x  ;
```

Which one of the following statements evaluates to true?

(x==5000)	false
(x==37)	true
(&x==9500)	false
(&x==5000)	true
(px==9500)	false
(px==37)	false
(*px==9500)	false
(*px==37)	true




```
// my first pointer
#include <stdio.h>

int main ()
{
  int firstvalue, secondvalue;
  int * mypointer;

  mypointer = &firstvalue;
  *mypointer = 10;
  mypointer = &secondvalue;
  *mypointer = 20;

  printf("firstvalue is %d\n", firstvalue);
  printf("secondvalue is %d\n",secondvalue);
  return 0;
}
```

```
firstvalue is 10
secondvalue is 20
```

```
// more pointers
#include <stdio.h>

int main ()
{
  int firstvalue = 5, secondvalue = 15;
  int * p1, * p2;

  p1 = &firstvalue;  // p1 = address of firstvalue
  p2 = &secondvalue; // p2 = address of secondvalue
  *p1 = 10;          // value pointed to by p1 = 10
  *p2 = *p1;         // value pointed to by p2 =
                     //value pointed to by p1
  p1 = p2;           // (value of pointer is copied)
  *p1 = 20;          // value pointed to by p1 = 20

  printf("firstvalue is %d\n",firstvalue);
  printf("secondvalue is %d\n",secondvalue);
  return 0;
}
```



```
firstvalue is 10
secondvalue is 20
```