1.what is pointer? Exemplify the use of pointers to pass multiple arguments and return multiple arguments with a suitable code.

->a pointer is a variable which contains address of another variable or memory location.

Pointer is used to points the address of the value stored anywhere in the computer memory.

This variable can be char, int, array, function.

Syntax:- datatype*var_name;

Example:

```
#include <stdio.h>
struct greaterSmaller {
	int greater, smaller;
};

typedef struct greaterSmaller Struct;

Struct findGreaterSmaller(int a, int b)
{
	Struct s;
	if (a > b) {
		s.greater = a;
		s.smaller = b;
	}
	else {
		s.greater = b;
		s.smaller = a;
	}

	return s;
}

int main()
```

```
{
        int x, y;
        Struct result;

        printf("Enter two numbers: \n");
        scanf("%d%d", &x, &y);


        result = findGreaterSmaller(x, y);
        printf("\nThe greater number is %d and the"
                "smaller number is %d",
                result.greater, result.smaller);

        return 0;
}
```

2.what is stack? List any two applications of stack. Write a function for PUSH operation.

->it is a data structure, where elements can be inserted from one end and deleted from same end.

Stacks in Data Structures is a linear type of data structure that follows the LIFO (Last-In-First-Out) principle and allows insertion and deletion operations from one end of the stack data structure.

Applications:

Backtracking Algorithms: The backtracking algorithm uses stacks to keep track of the states of the problem-solving process. The current state is pushed onto the stack, and when the algorithm backtracks, the previous state is popped from the stack.

Expression evaluation: Stack data structure is used to evaluate expressions in infix, postfix, and prefix notations. Operators and operands are pushed onto the stack, and operations are performed based on the stack's top elements.

PUSH operation: The PUSH operation is used to insert a new element in the Stack. PUSH operation inserts a new element at the top of the stack. It is important to check overflow condition before push operation when using an array representation of Stack.

3.write insert and delete functions for circular queue.

-> A circular queue is the extended version of a regular queue where the last element is connected to the first element. Thus, forming a circle-like structure. Circular queue representation. The circular queue solves the major limitation of the normal queue.

Enqueue- adding an element in the queue if there is space in the queue.

enQueue(value): This function is used to insert the new value in the Queue. The new element is always inserted from the rear end.

Rear- get the last item from the queue.

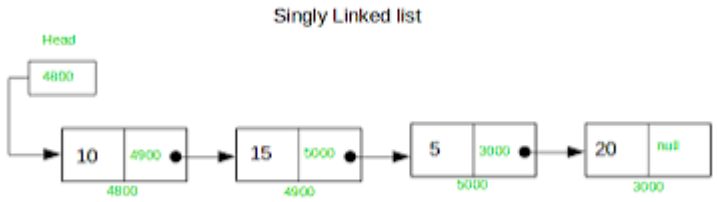
Dequeue- Removing elements from a queue if there are any elements in the queue.

deQueue(): This function deletes an element from the Queue. The deletion in a Queue always takes place from the front end.

Front- get the first item from the queue.

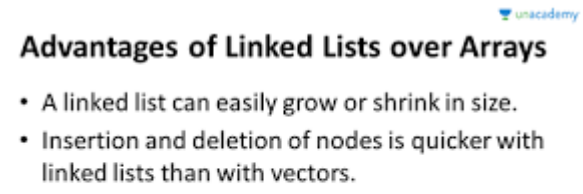
4.Discuss the arrangements of node in singly linked list, also give the advantages of linked list over arrays.

->a singly linked list is a set of nodes where each nodes has two fields “data” and “link”. Data field stores actual piece of information and link field is used to point next node. Basically the link field stores address of next node.



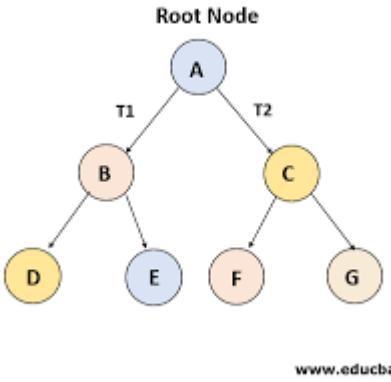
Advantages of linked list:

Linked lists have dynamic size allocation, allowing for efficient insertion and deletion of elements at any position.

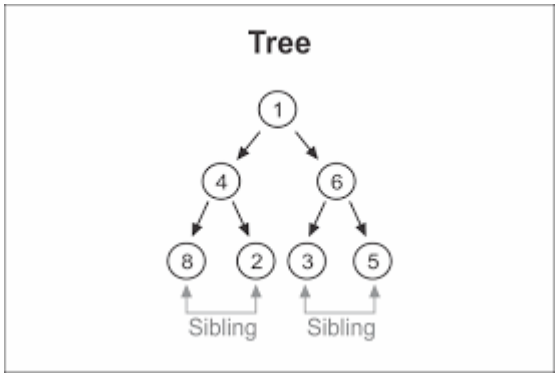


5.define,

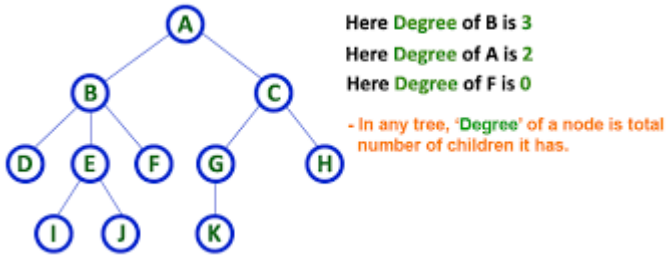
A: root-> In a tree data structure, the first node or the topmost node is called as root node. Every tree must have only one root node.



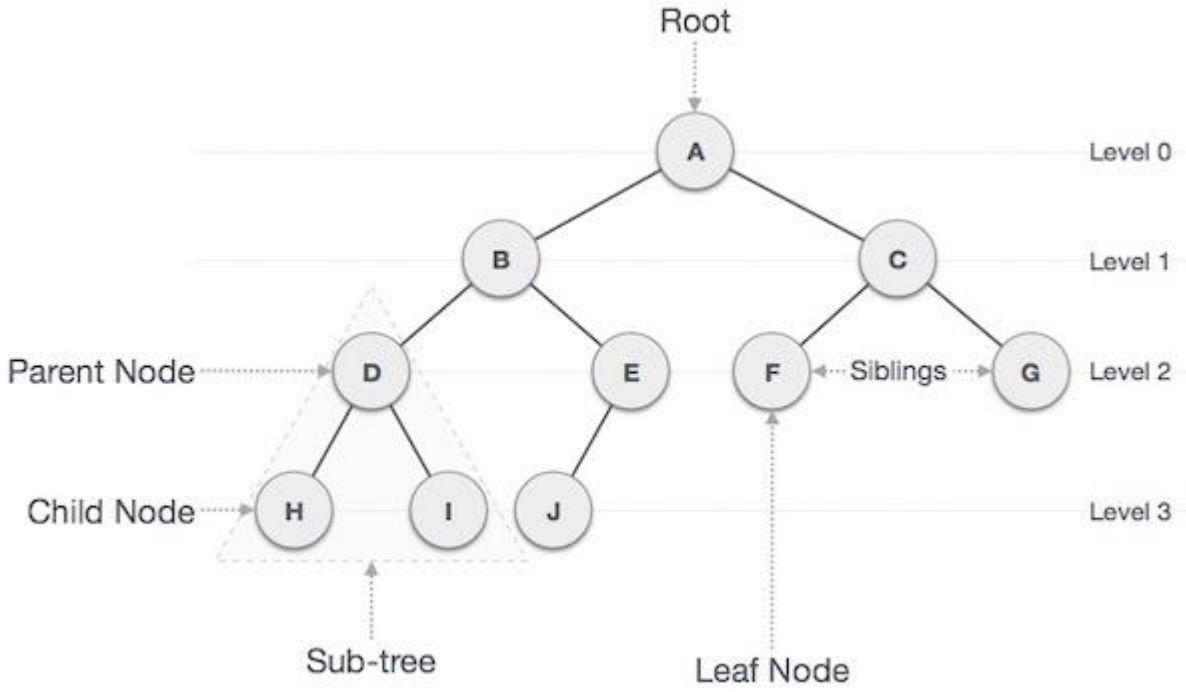
B: Siblings-> in a tree data structure, nodes which belongs to same parent are called as siblings.



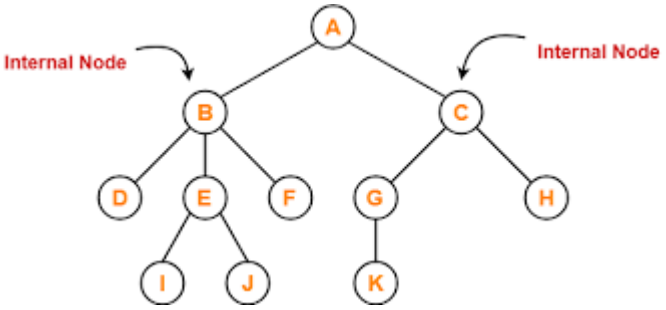
C: Degree of node-> in a tree data structure, the total number of children of node is called as degree of node.



D: Leaf node-> it is also known as external or terminal node which it is a tree data structure the node which does not have child is called as leaf node.



E: Internal node-> it is also known as operator node and in a tree data structure the nodes which has atleast one child is internal node.



F: Parent node: in a tree data structure the node which is a predecessor of any node is a parent node.