Question (1):

a) Create a `struct` for **Student** information that has the following elements in it:

- Name, id, age, and department.

```
Struct Student {
string name;
int id;
int age;
string department;
} ;
```

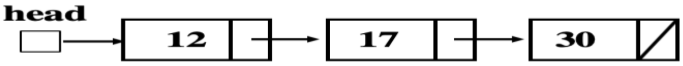
b) Create an object of **Student** and assign the following values and print them all on the screen.

- Name = “Hatim”
- id = 44300551
- age = 20
- department = “Computer Science”

```
Student M={“Hatim”,4430051,20,”computer Science”};

        cout<<"name”<<M.name<<endl;
        cout<<"id"<«M.id<<endl;
        cout<<"age"<<M.age<<endl;
        cout<<"department"<<M.department<<endl;
```

c) Assume that we have the following non-empty linked list



Write a C++ function to insert a new node with the value 5 in the beginning of the linked list.

```
Void insertNode(int value){

  Node *ptr = new Node();
  ptr->data=5;
  ptr->next=head;
  head = ptr;
  }

}
```

Question (2): Pointers

The following question is about ‘pointer to pointer’. Solve it carefully.

a) Write the output of the program.

```
int main(){
  int a = 10;
  int *p = &a;
  int **pp = &p;
  cout << **pp << endl;
  cout << *p  << endl;
}
```

Output:

10
10

b) What is the output of the following program?

```
int main () {
   int array [5] = {2,6,7,8,9};
   int *pa, *pb, i;
   pa = &array [1];
   pb = &array [4];
   i = *pb - *pa;
   cout << “The value of i is:” << i << endl;
   i = *pa - *pb;
   cout << “The value of i is:” << i << endl;
   array [1] = array [4] = 0;
   cout << “The value of i is:” << i << endl;
   *pb = *pa + 10;
   cout << “*pa =” << *pa << endl;
}
```

Output:

3
-3
-3
0

c) If the size of one integer is 4 bytes, how much memory is allocated to an array of 12 integers?

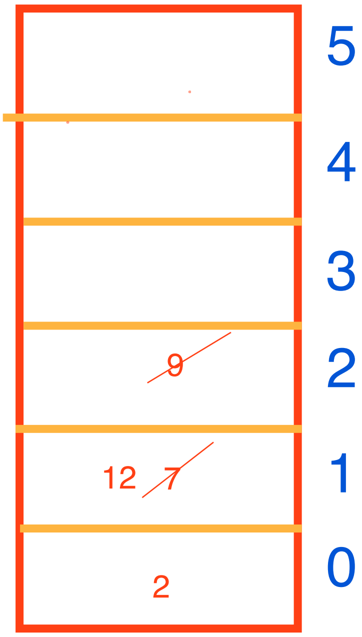
```
int iarray[12] = {2, 3, 6, 8, 5, 4, 7, 1, 9, 0, 1, 3};
```

Size of iarray in memory = 48

Question (3): Stack

a) Suppose STACK has 6 memory cells as its maximum size and initially its top= -1. Find the output of the following pseudo code:

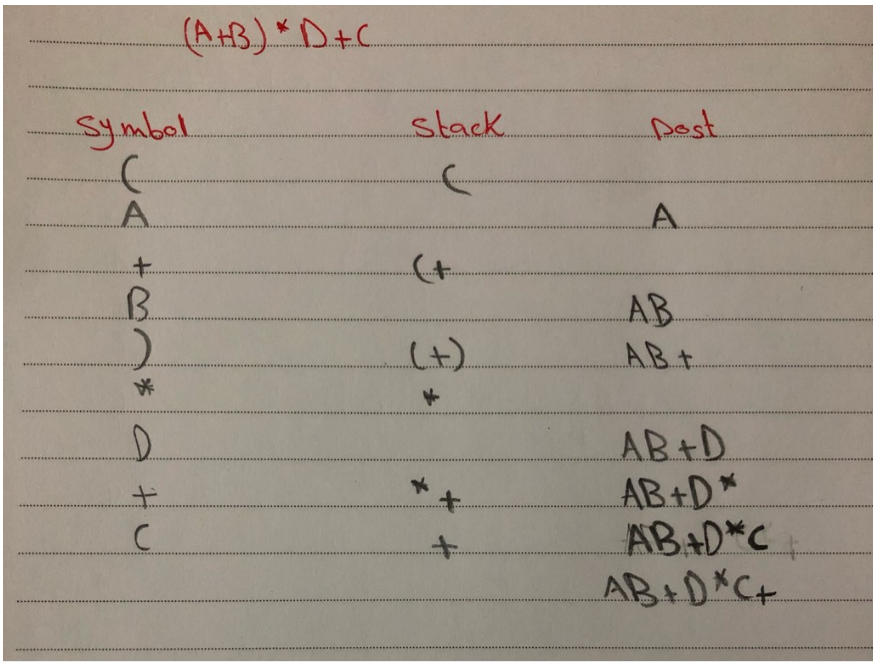
```
a = 2; b = 5;
push (a);
push (b+2);
push (9);
pop ();
pop ();
push (a+10);
```



Output:
12 2
The top is : 1

b) Convert the following infix expression into postfix ones:

(A + B) * D + C



(A+B)*D+C

Symbol	Stack	Post
(	(	
A		A
+	(+	
B		AB
)	(+)	AB+
*	*	
D		AB+D
+	*+	AB+D*
C	+	AB+D*C
		AB+D*C+

End of Questions