Assignment-4

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CSE-G

1) Write a program to incert and delete an element at the nth and kth pocition in a linked List where n and k is taken from user.

A)
```
#include <stdio.h>
#include <stdlib.h>
struct node {
int data;
struct Node*next;
};
struct node*head;
void incert(int data, int n){
node * temp = new node;
 temp -> data = data;
 temp -> next = Null;
 if (n==1){
   temp -> next = head;
      head = temp;
    return;
  }
void delete (int k){
struct node* temp = head;
if (k==1){
head = temp -> next;
free(temp);
return ;
  }
Node *temp=head ;
 for (int i=0; i<n-2,i++) {
temp=temp -> next ;
 }
temp->next=temp->next;
 temp -> next = temp;
}
 void print ();
for (int i=0; i<k-2; i++)
  temp = temp -> next;
  free (temp);
 }
int main () {
 int n,x,k
  head = Null;
  printf ("Enter the position for inserting: ");
  scanf ("%d", & n);
  scanf ("%d", & x);
 Insert (x,n) ;
 printf ("Enter the position to delete);
 scanf ("%d", & k)
 delete(k);
```

```
print (x);
return ;
}
```

2) Construct a new linked list by merging alternate nodes of two lists for example in list 1 {1,2,3} and in list 2 {4,5,6} in new list we should have {1,4,2,5,3,6}

A)
```
# include <stdio.h>
# include <stdio.h>
  struct node {
  int data ;
 struct node *next;
 }
 void print list (struct node *head)
 {
  printf(" %d →", (ptr→ data));
     ptr = ptr→next ;
     printf(" Null/n") ;
  }
 void push (struct node * head, int data)
 {
 struct node * new= (struct node *) malloc
           (size of (structnode));
  new → data = data ;
  new → next = * head;
   *head=new;
```

```
}

struct Node* merge(struct node*a, struct noble *b)
{
struct node fake ;
 struct node* fail = fake ;
  fake.next = Null ;
   while (1) {
  if (a == null)
  {
   tail -> next = b;
    break ;
  }
 else if (b= null)
  { tail -> next = a;
     break ;
  }
  else
  {
   fail -> next = a
    tail = a
   a = a -> next ;
   tail -> next = b;
   }
 }
  return fake.next ;
  }
  void main()
  {
```

```
int keys[] = {1, 2, 3,4,5,6,7}
int n= size of (keys)/size of keys[0]
Struct node * a = null ; *b = null;
for (int i=n-i ; i>0; i= i-a)
    push(&a, keys[i]) ;
for (int i = n-2 ; i>=0 ; i=i-2)
    push(&b ; keys[i]);
 struct node * head = merge (a,b);
  print list(head);
 }
```

3) Find all the elements in the stack whose sum is equal to k.

A) # include <stdio.h>

```
  void find(int arr[], int a , int k) {
  int total = 0
  int x=0, y=0;
 ~~for (x=0; x<a, x++){~~
 ~~While~~ for (x=0 ; x<a, x++){
  while (total <k, && y<a)
      total = arr[y]
         y++ ;
    if (total = =0)
    { printf("find");
```

```
return ; }
 total -= arr [x] ;
 }
} int main(void) {
   int arr[] = {9,10,12,4,1,2,};
   int k = 565 ;
   int a = sizeof(arr)/sizeof(arr[0]);
  find (arr,a, k);
   return 0;
 }
```

4) A)

```
# include <stdio.h>
# define size 20
 void insert(int);
 void delete () ;
 int queue [20], a=-1, b=-1;
 void main() {
 int num ; choice ;
 while (1) {
 printf("\n New \n");
 printf("1.insert \n 2.delete \n 3. Print
        \n 4.Reverse \n 5.Alternate \n 6 Exit");
  printf("\n Enter your choice");
 scanf("%d", &choice);
  switch (choice){
case 1: printf("Enter the num to insert:");
  scanf("%d", &num);
  insert(num);
 break;
case 2: printf("Reverse queue");
     for (int i = size, i>0, i--)
        if (queue[i]==0)
         continue;
     printf("%d", queue[i]);
   }
     break;
 case 3:
     printf("Alternate elements");
        for (int i=0, i<size, i>0, i++2)
   { if (queue[i]==0)
        continue;
      printf("%d", queue [i]);
   }
      break;
  return 0;
 }
```

5) i) Array vs linked lists

1) Both are the data structure. Both are used to store the data.

2) Cost of accessing the elements

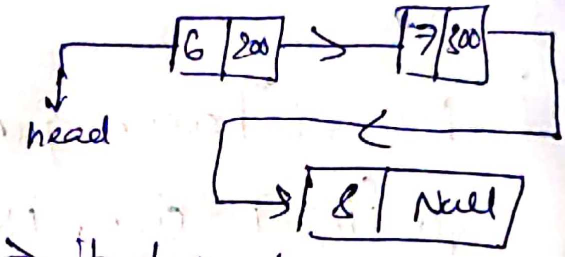
Arrays

6	7	0	1	

⇒ it takes at constant time

$\boxed{O(1)}$

linked list



⇒ It depends on number of nodes in the linked list

$\boxed{O(n)}$

3) Memory requirement and utilization.

Array

⇒ Ineffective in memory uttilization

Ex:

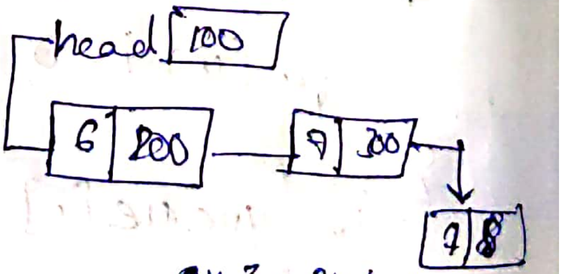
6	7	8	-	-	-		
0	1	2	3	4	5	6	7

8×4 = 32 bytes

Used = 12

linked list

⇒ it is in dynamic byte



8×3 = 24 byte

⇒ Require memory in less

⇒ More requirement

4) Cost of insestion and cost of delation

Array	linked list
Begining - O(n)	O(1)
At end - O(1)	O(n)
ith position - O(n)	O(n)

5. Easy use and operations

Array	linked list
→ easier to use	→ less eassier
→ linear and binary	→ linear

(ii)
```
#include <stdio.h>
 #include <stdlib.h>
 int len[int a()]
 {
  int i=0, x,y=0
   while(1)
   {
    if(x[i])
    {
     xy++, i++;
    }
  else
   {
    break;
  }
}
 return xy;
}
void change list (int x[], int a[])
 {
   for (int i=len(x)-1, i>=0 , i--)
   {
     x[i+1] = x[i]
   }
  x[0]=a[0];
  printf("\n Elements of old array :\n");
 for (int i=0; i<len(x); i++)
  { printf("%d", x[i]);
  }
 for (int i=0, i<len(y); i++)
   {
     y[i]= y[i+1];
   }
  printf("\n Element of newarray: \n")
 for (int i=0; i<len(a); i++)
 {
 printf("%d", a[i]);
 }
int main()
```

```
{int x[10]={1,2,3}, a[10] = {4,5,6};
  Change list=(a,b);
}
```