**Program:**

**/\*insertion of a single linked list\*/**

#include<stdio.h>

#include<stdlib.h>

void insertion();

void traversal();

struct node

{

int data;

struct node \*link;

}\*ptr,\*header,\*new1;

void main()

{

int ch;

header=(struct node \*)malloc(sizeof(struct node));

header->link =NULL;

while(1)

{

printf("\nenter the choice of operation 1.insert 2.traversal: ");

scanf("%d",&ch);

switch(ch)

{

case 1:insertion();

break;

case 2:traversal();

break;

default:exit(0);

}

}

}

void insertion()

{

int item,x,key,pos;

printf("enter the data value to insert");

scanf("%d",&x);

new1=(struct node\*)malloc(sizeof(struct node));

printf("enter the position for insertion 1.begining 2.ending 3.At any position");

scanf("%d",&pos);

/\* insertion at beginning\*/

if(pos==1)

{

new1->link= header->link;

header->link=new1;

new1->data=x;

}

/\* insertion at ending\*/

else if(pos==2)

{

ptr=header;

while(ptr->link!=NULL)

{

ptr=ptr->link;

}

ptr->link=new1;

new1->link=NULL;

new1->data=x;

}

/\* insertion at any pos\*/

else if(pos==3)

{

printf("\nenter key value");

scanf("%d",&key);

ptr=header;

while(ptr->link!=NULL && ptr->data!=key)

{

ptr=ptr->link;

}

if(ptr->link==NULL)

{

/\* Special case i.e. insertion of a node at any position that leads to insertion at end\*/

if(ptr->data==key)

{

new1->link=ptr->link;

ptr->link=new1;

new1->data=x;

}

else

{

printf("\n Key not available");

}

}

else

{

new1->link=ptr->link;

ptr->link=new1;

new1->data=x;

}

}

}

void traversal()

{

printf("\n elements in the list are");

ptr=header;

while(ptr->link!=NULL)

{

ptr=ptr->link;

printf("\t%d",ptr->data);

}

}

enter the choice of operation 1.insert 2.traversal: 2

elements in the list are

enter the choice of operation 1.insert 2.traversal: 1

enter the data value to insert1

enter the position for insertion 1.begining 2.ending 3.At any position2

enter the choice of operation 1.insert 2.traversal: 2

elements in the list are 1

enter the choice of operation 1.insert 2.traversal: 1

enter the data value to insert4

enter the position for insertion 1.begining 2.ending 3.At any position1

enter the choice of operation 1.insert 2.traversal: 2

elements in the list are 4 1

enter the choice of operation 1.insert 2.traversal: 1

enter the data value to insert5

enter the position for insertion 1.begining 2.ending 3.At any position3

enter key value4

enter the choice of operation 1.insert 2.traversal: 2

elements in the list are 4 5 1

enter the choice of operation 1.insert 2.traversal: