

PN_CODING_CHALLENGE_3 – 29/06/2020

1. Write a C++ Program Create a linked list and Append the nodes using class and object.

Solution:

```
#include <iostream>
using namespace std;
struct Node
{
    int data;
    struct Node *next;
};

void push(struct Node** head, int node_data)
{
    struct Node* newNode = new Node;

    /* 2. assign data to node */
    newNode->data = node_data;

    /* 3. set next of new node as head */
    newNode->next = (*head);

    /* 4. move the head to point to the new node */
    (*head) = newNode;
}

void insertAfter(struct Node* prev_node, int node_data)
{
    if (prev_node == NULL)
    {
        cout<<"the given previous node is required,cannot be NULL"; return; }
    struct Node* newNode =new Node;
    newNode->data = node_data;
    newNode->next = prev_node->next;
    prev_node->next = newNode;
}

void append(struct Node** head, int node_data)
{
    struct Node* newNode = new Node;

    struct Node *last = *head;
    newNode->data = node_data;

    newNode->next = NULL;
```

```

if (*head == NULL)
{
*head = newNode;
return;
}
while (last->next != NULL)
last = last->next;
last->next = newNode;
return;
}

// display linked list contents
void displayList(struct Node *node)
{
while (node != NULL)
{
cout<<node->data<<"-->";
node = node->next;
}

if(node== NULL)
cout<<"null";
}

int main()
{

struct Node* head = NULL;
append(&head, 10);
push(&head, 20);
push(&head, 30);

append(&head, 40); //

insertAfter(head->next, 50);

cout<<"Final linked list: "<<endl;
displayList(head);

return 0;
}
*****

```

2. Write a C++ Program to find the sum of series $1+x+x(\text{pow})^2+\dots+x(\text{pow})^n$ using constructor.

Solution:

```
#include<iostream.h>
#include<conio.h>
#include<math.h>

void main()
{
clrscr();
long i,n,x,sum=1;

cout<<"1+x+x^2+.....+x^n";
cout<<"\nEnter the value of x and n:";
cin>>x>>n;

for(i=1;i<=n;++i)
sum+=pow(x,i);
cout<<"\nSum="<<sum;
getch();
}
*****
```

3. Write a c++ Program to find the area of square, triangle and rectangle using function overloading.

Solution:

```
#include<iostream>
using namespace std;
int area(int);
int area(int,int);
float area(float);
float area(float,float);
int main()
{
    int s,l,b;
    float r,bs,ht;
    cout<<"Enter side of a square:";
    cin>>s;
    cout<<"Enter length and breadth of rectangle:";
    cin>>l>>b;
    cout<<"Enter radius of circle:";
    cin>>r;
    cout<<"Enter base and height of triangle:";
    cin>>bs>>ht;
    cout<<"Area of square is "<<area(s);
    cout<<"\nArea of rectangle is "<<area(l,b);
    cout<<"\nArea of circle is "<<area(r);
    cout<<"\nArea of triangle is "<<area(bs,ht);
}
int area(int s)
```

```

{
    return(s*s);
}
int area(int l,int b)
{
    return(l*b);
}
float area(float r)
{
    return(3.14*r*r);
}
float area(float bs,float ht)
{
    return((bs*ht)/2);
}
*****

```

4. Write a C++ Program to Find All Roots of a Quadratic Equation

Solution:

```

#include <iostream>
#include <cmath>
using namespace std;

int main() {

    float a, b, c, x1, x2, discriminant, realPart, imaginaryPart;
    cout << "Enter coefficients a, b and c: ";
    cin >> a >> b >> c;
    discriminant = b*b - 4*a*c;

    if (discriminant > 0) {
        x1 = (-b + sqrt(discriminant)) / (2*a);
        x2 = (-b - sqrt(discriminant)) / (2*a);
        cout << "Roots are real and different." << endl;
        cout << "x1 = " << x1 << endl;
        cout << "x2 = " << x2 << endl;
    }

    else if (discriminant == 0) {
        cout << "Roots are real and same." << endl;
        x1 = (-b + sqrt(discriminant)) / (2*a);
        cout << "x1 = x2 =" << x1 << endl;
    }

    else {
        realPart = -b/(2*a);
        imaginaryPart =sqrt(-discriminant)/(2*a);
        cout << "Roots are complex and different." << endl;
        cout << "x1 = " << realPart << "+" << imaginaryPart << "i" << endl;
        cout << "x2 = " << realPart << "-" << imaginaryPart << "i" << endl;
    }
}

```

```
}  
  
    return 0;  
}  
*****
```