

Homework 5

INTE 11223

Programming Concept

IM/2019/062

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1. Write a function `integerPower(base, exponent)` that returns the value of `baseexponent`. For example, `integerPower(3, 4) = 3 * 3 * 3 * 3`. Assume that `exponent` is a positive, nonzero integer, and `base` is an integer. Function `integerPower` should use `for` to control the calculation. Do not use any math library functions.

```
#include<iostream>
```

```
using namespace std;
```

```
//function to calculate power of an integer
```

```
void integerPower(int base, int exponent)
```

```
{
```

```
    int i=0, answer = 1; //i-iterative value, answer-base^exponent
```

```
    for (i; i<exponent; i++)
```

```
    {
```

```
        answer = answer * base;
```

```
    }
```

```
    cout << base << " ^ " << exponent << " = " << answer;
```

```
}
```

```
int main()
```

```
{
```

```
    //variables
```

```
    int base, exponent;
```

```
    int i;
```

```
    //get user inputs and assign them
```

```
    cout << "Enter integer for base: ";
```

```
    cin >> base;
```

```
    cout << "Enter positive nonzero integer for exponent: ";
```

```
    cin >> exponent;
```

```
    //check if the exponent is a postive nonzero value
```

```
    for(i=0; exponent<=0; i++)
```

```
    {
```

```
        cout << "Invalid Value! Enter positive nonzero integer for exponent: ";
```

```
        cin >> exponent;
```

```

    }
    //call the function
    integerPower(base, exponent);

    return 0;
}

```

2. Write a function that takes the time as three integer arguments (for hours, minutes, and seconds), and returns the number of seconds since the last time the clock "struck 12." Use this function to calculate the amount of time in seconds between two times, both of which are within one 12-hour cycle of the clock.

```
#include<iostream>
```

```
#include <stdio.h>
```

```
using namespace std;
```

```
//function
```

```
int timeInSeconds(int hrs, int mins, int s)
```

```
{
```

```
    return (hrs*60*60 + mins*60 + s); //convert hours and mins to seconds
```

```
}
```

```
int main()
```

```
{
```

```
    //variables
```

```
    int hrs1, mins1, s1;
```

```
    int hrs2, mins2, s2;
```

```

    cout << "CALCULATING THE AMOUNT OF TIME IN SECONDS BETWEEN TWO TIMES\n" <<
endl;

```

```

    cout << "Please be careful to enter a valid time within the 12-hour cycle clock! \n" <<
endl;

```

```
//get user inputs for time 1 and assign them to variables
```

```
cout << "Enter time 1 (hours[space]minutes[space]seconds): ";
```

```
cin >> hrs1 >> mins1 >> s1;
```

```
//check the validity of time 1
```

```
for (int i=0; (hrs1>=12 || hrs1<0) || (mins1>59 || mins1<0) || (s1>59 || s1<0); i++)
```

```
{
```

```
    cout << "Invalid time! \nEnter time 1 (hours[space]minutes[space]seconds): ";
```

```
    cin >> hrs1 >> mins1 >> s1;
```

```
}
```

```
//get user inputs for time 2 and assign them to variables
```

```
cout << "Enter time 2 (hours[space]minutes[space]seconds): ";
```

```
cin >> hrs2 >> mins2 >> s2;
```

```

//check the validity of time 2
for (int j=0; (hrs2>=12 || hrs2<0) || (mins2>59 || mins2<0) || (s2>59 || s2<0); j++)
{
    cout << "Invalid time! \nEnter time 2 (hours[space]minutes[space]seconds): ";
    cin >> hrs2 >> mins2 >> s2;
}

//call the function and calculate difference
int difference = timeInSeconds(hrs1, mins1, s1) - timeInSeconds(hrs2, mins2, s2);

//Display difference
cout << "\nTime difference is " << abs(difference) << " second(s)";
//abs() is for the absolute value

return 0;
}

```

3. Write function distance that calculates the distance between two points (x1, y1) and (x2, y2). All numbers and return values should be of type double.

```

#include <iostream>
#include <math.h> //to find square-root(sqrt) and power(pow)
using namespace std;

//function to calculate the distance between two points
double distance(int x1, int y1, int x2, int y2)
{
    //using pythagoras theorem to calculate r
    double r = sqrt( (pow(x2-x1,2)) + (pow(y2-y1,2)) );
    return r;
}

int main()
{
    //variables
    double x1, y1, x2, y2;

    //get user inputs and assign them
    cout << "Enter x1: ";
    cin >> x1;
}

```

```

    cout << "Enter y1: ";
    cin >> y1;
    cout << "Enter x2: ";
    cin >> x2;
    cout << "Enter y2: ";
    cin >> y2;

    //call the function
    double d = distance(x1,y1,x2,y2);

    //Display distance
    cout << "Distance between the 2 points is: " << d ;

    return 0;
}

```

4. The Fibonacci sequence is a sequence of numbers such that the first and second numbers are 0 and 1 respectively, and each number after the second is the sum of its two predecessors. Design a recursive function that take a positive value of N as input, and outputs the first N elements of the Fibonacci series.

```

#include<iostream>
using namespace std;

//function
void fibonacci(int n)
{
    int n1=0, n2=1; //1st and 2nd numbers in fibonacci system are 0 and 1
    int i, temp;    // i-iterative value, temp-used to swap

    if(n==0)
        return;    //1st value is 0
    cout << n1 << " ";    //display 1st value

    //loop to print the fibonacci sequence upto N
    for(i=1; i<n; i++)
    {
        cout << n2 << " ";
        temp = n1 + n2;
        n1 = n2;
        n2 = temp;
    }
}

```

```
int main()
{
    int N; //number of elements

    //get user input
    cout << "Enter value for N: ";
    cin >> N;

    // call the function
    fibonacci(N);

    return 0;
}
```