

Task 5

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Questions :

i.

Take input of principle amount (P), rate of interest (R), total amount (A), and number of times interest is calculated in a year (n) and find the total time using the given data.

ii.

Take an input number from the user and find its factorial.

iii.

Print if the user input number is prime or not.

iv.

Print if the user input number/string is palindrome or not.

v.

Check whether the user input number is an Armstrong number or not.

vi.

Check for odd or even of the user input number.

vii.

Create a basic calculator and ask for the two numbers and operation to be performed to the user. (The calculator must contain 4 basic arithmetic operators '+', '-', '*', '/'.)

viii.

Take input of side lengths of a triangle from the user and decide the type of the triangle. (isosceles, equilateral, and scalene).

ix.

Take input of a random year from the user and check whether the year is a leap year or not.

x.

Take a character input from the user and check if the alphabet is vowel or consonant.

xi.

Take input from the user for the base length and height for a right-angle triangle and find the hypotenuse of that triangle.

Answers:

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

double calculateTotalTime(double P, double R, double A, int n) {
    double time = (A - P) / (P * R);
    return time;
}

int factorial(int n) {
    if (n == 0)
        return 1;
    return n * factorial(n - 1);
}

bool isPrime(int n) {
    if (n <= 1)
        return false;
    for (int i = 2; i <= sqrt(n); ++i) {
        if (n % i == 0)
            return false;
    }
    return true;
}

bool isPalindrome(string str) {
    int left = 0, right = str.length() - 1;
    while (left < right) {
        if (str[left] != str[right])
            return false;
        left++;
        right--;
    }
    return true;
}

bool isArmstrong(int num) {
    int sum = 0;
    int temp = num;
    while (temp != 0) {
        int digit = temp % 10;
        sum += digit * digit * digit;
        temp /= 10;
    }
    return sum == num;
}
```

```

bool isEven(int num) {
    return num % 2 == 0;
}

double calculator(double a, double b, char op) {
    switch(op) {
        case '+': return a + b;
        case '-': return a - b;
        case '*': return a * b;
        case '/': return a / b;
        default: return 0;
    }
}

string typeOfTriangle(double a, double b, double c) {
    if (a == b && b == c)
        return "Equilateral";
    else if (a == b || b == c || a == c)
        return "Isosceles";
    else
        return "Scalene";
}

bool isLeapYear(int year) {
    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0))
        return true;
    return false;
}

bool isVowel(char c) {
    return (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u' ||
            c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U');
}

double hypotenuse(double base, double height) {
    return sqrt(base * base + height * height);
}

int main() {
    double P, R, A;
    int n, num;
    string str;
    char op, ch;
    double a, b, side1, side2, side3, base, height;
    int year;

```

```

    cout << "Enter principle amount, rate of interest, total amount, and
number of times interest is calculated in a year: ";
    cin >> P >> R >> A >> n;
    cout << "Total time is " << calculateTotalTime(P, R, A, n) << endl;

    cout << "Enter a number for factorial calculation: ";
    cin >> num;
    cout << "Factorial is " << factorial(num) << endl;

    cout << "Enter a number to check if it is prime: ";
    cin >> num;
    cout << "Entered number is ";
    if (!isPrime(num))
        cout << "not ";
    cout << "prime" << endl;

    cout << "Enter a string to check if it is palindrome: ";
    cin >> str;
    cout << "Entered string is ";
    if (!isPalindrome(str))
        cout << "not ";
    cout << "palindrome" << endl;

    cout << "Enter a number to check if it is an Armstrong number: ";
    cin >> num;
    cout << "Entered number is ";
    if (!isArmstrong(num))
        cout << "not ";
    cout << "an Armstrong number" << endl;

    cout << "Enter a number to check if it is even or odd: ";
    cin >> num;
    cout << "Entered number is ";
    if (!isEven(num))
        cout << "odd" << endl;
    else
        cout << "even" << endl;

    cout << "Enter two numbers for arithmetic operation: ";
    cin >> a >> b;
    cout << "Enter an operation (+, -, *, /): ";
    cin >> op;
    cout << "Result is " << calculator(a, b, op) << endl;

    cout << "Enter three sides of a triangle: ";
    cin >> side1 >> side2 >> side3;
    cout << "Triangle is " << typeOfTriangle(side1, side2, side3) << endl;

```

```
cout << "Enter a year to check if it is a leap year: ";
cin >> year;
cout << "Entered year is ";
if (!isLeapYear(year))
    cout << "not ";
cout << "a leap year" << endl;

cout << "Enter a character to check if it is a vowel or consonant: ";
cin >> ch;
cout << "Entered character is a ";
if (!isVowel(ch))
    cout << "consonant" << endl;
else
    cout << "vowel" << endl;

cout << "Enter base and height of a right-angle triangle: ";
cin >> base >> height;
cout << "Hypotenuse is " << hypotenuse(base, height) << endl;

return 0;
}
```