

FAST, LHR(Mid-term Exam PF 1B_{v1})

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Student Name	Roll No	Section	Q1 Marks	Q2 Marks	Total Marks
			20	20	40

NOTE:

You are not allowed to use Lists/Arrays/Vectors etc

Given Code

factorial functions for Q1

- Use this code for Q1
- $3!$ can be written as $fac(3)$

```
#include <iostream>
#include <iomanip>
using namespace std;

long long int fac(unsigned int n){
    if (n > 0) return n * fac(n-1);
    else
        return 1;
}

int main(int argc, char *argv[])
{
    // following two lines are only for testing purpose
    // you can use remove them
    int x = fac(3);
    cout << x << endl; // 6

    float result = 0.12345;
    cout << fixed << setprecision(2) << result << endl; // 0.12
    // code your Q1
    return 0;
}
```

Set precision to 5 decimal

let $x = 0.12345$

- if precision is to 2 decimal places, then x will be 0.12
- `cout << fixed << setprecision(2) << number << endl;`

Q1

Estimate $f(0.5)$ (marks: 20)

- $f(x)$ till 5 terms just for pattern purpose
- But you will use 20 terms to estimate $f(0.5)$

$$f(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \dots$$

Replace x with 0.5 and follow the pattern

e.g $f(x)$ till 5 terms

$$f(0.5) = 0.5 - \frac{0.5^3}{3!} + \frac{0.5^5}{5!} - \frac{0.5^7}{7!} + \frac{0.5^9}{9!} - \dots$$

If you increase the number of terms, e.g, 7,
then $f(0.5)$ will have more accurate result as compared to 5 terms

Print the final value of $f(0.5)$ to 5 decimals

`cout << fixed << setprecision(5) << result << endl;`

Continue

Q2 (sum of first 50 terms)

Anato Series (Marks: 20)

- 1st term: 1
- 2nd term: 2
- 3rd term: 3
- nth term: sum of previous 2 odd terms if n is even
- nth term: sum of previous 2 even terms if n is odd

First 6 Terms and theirs sums

nth Term	term	sum of nth terms
1 st	1	1
2 nd	2	1+2= 3
3 rd	3	1+2+3=6
4 th	4 is even: 1 st + 3 rd = 1 + 3 = 4	1+2+3+4=10
5 th	5 is odd: 2 nd + 4 th = 2 + 4 = 6	1+2+3+4+6=16
6 th	6 is even: 3 rd + 5 th = 3 + 6 = 9	1+2+3+4+6+9=25

Find sum of first 50 terms of Anato Series