

Practice Examples for Lab: Set 3

- 1 Write a program to approximately compute e^x by adding first 15 terms of the series

$$e^x = \frac{x^0}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

- 2 Write a program that computes the value of an n th degree polynomial $A(x) = a_0 + a_1x + a_2x^2 + \dots + a_nx^n$. Assume that you are given n then the value x , and then the coefficients a_0, a_1, \dots, a_n .
- 3 Evaluate the polynomial, but this time assume that you are given the coefficients in the order a_n, a_{n-1}, \dots, a_0 .
- 4 Write a program to compute the value of

$$D(r) = \sum_{k=0}^r (-1)^k \frac{r!}{k!}$$

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- 5) Which of the following programs correctly approximates value of 'e'?

```
main_program{  
    int n, fac=1, i=2;  
    double e=1.0;  
    cin >> n;  
  
    repeat(n){  
        e = e + 1.0/fac;  
        fac = fac * i;  
        i = i + 1;  
    }  
    cout << e << endl;  
}
```

```
main_program{  
    int n, fac=1, i=1;  
    double e=1.0;  
    cin >> n;  
  
    repeat(n){  
        e = e + 1.0/fac;  
        fac = fac * i;  
        i = i + 1;  
    }  
    cout << e <<
```

- 6) Write a program to approximately compute $\sin(x)$ using its series:

$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}$$
$$= x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

valid for all $x \in \mathbb{R}$.