Note Title 27-09-2018

COL 100

Sep 27, 2018

Last Class :-

Streams → ifstream, ofstream

#include <iostream>

cout

cout << "..." ;

#include <sstream>

out streams

ostringstream out;

out << "..." ;

out.str()

#include <fstream>

ofstream outfile;

outfile << "..." ;

Logistics :-

(1) Ungraded Assignments is 5% (total)

(2) Practice for Minor 2 by Saturday

(3) Make-up exam for Minor 1 Minor 2 will be after Minor 2.

(4) Graded Assignments :

Best (n-1) out of n

```
ofstream outfile;
outfile.open(filename.c_str());
```

Standard Library functions:-

```
#include "filelib.h"
```

```
ifstream &infile,
ofstream outfile,
string filename = promptUserForFile(outfile,
                                    "Enter a
                                    file name");
```

Complexity Analysis / Efficiency

Understanding of a program

```
int fact(int n) {
    int result = 1;
    for (int i = 1; i <= n; i++) {
        result = result * i;
    }
    return result;
}

int main() {
```

Complexity Analysis

Factorial of 1 is = 1
Factorial of 2 is = 2

modified

```
int fact(int n) {
    int result = 1;
    for(int i=1; i<=n; i++) {
        result = result * i;
        cout<<"Factorial of "<<i<<" is "<<result;
    }
    return result;
}
```

int i=1;
while(i<=n)
result
i++

3 + 2*(1+2+3+ -- n) + 2*n + K

2*n +

= an^2+bn+c

Θ

$an+b$

5, 10, 100

Time = (1+K) + 2 + (10*2)

(1+K) + 2 + (100*3)

(K) + 2 + n*(2)

```
int main() {
    int n;
    cout<<"Enter n:";
    cin>>n;
    fact_modified(n);
    for(int i=1; i<=n; i++) {
        cout<<"Factorial of "<<n<<" is = "<<fact(n)
        <<endl;
    }
    return 0;
}
```

1 K + 2 + n*3

Linear in n.

O(n*(K)) = O(n)

an^2+bn+c

	n^2+n+1	$n+1$
$n=1$	3	2
$n=2$	7	3
$n=3$	13	4
$n=4$	21	5
$n=5$	31	6
6	43	7
7	57	8
8	73	9
9	91	10
10	111	11

$100^2+100+1$ = 10101

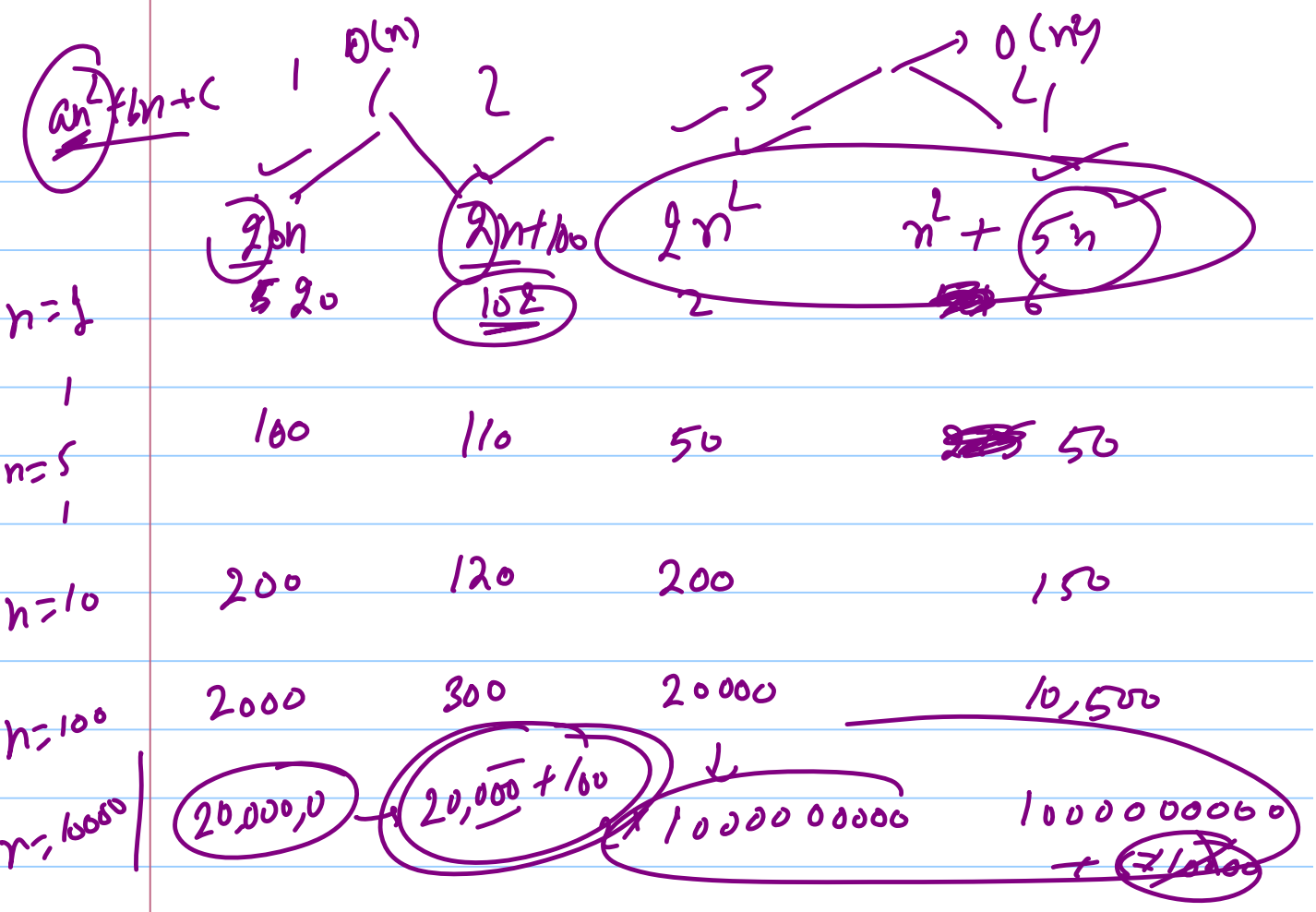
10!

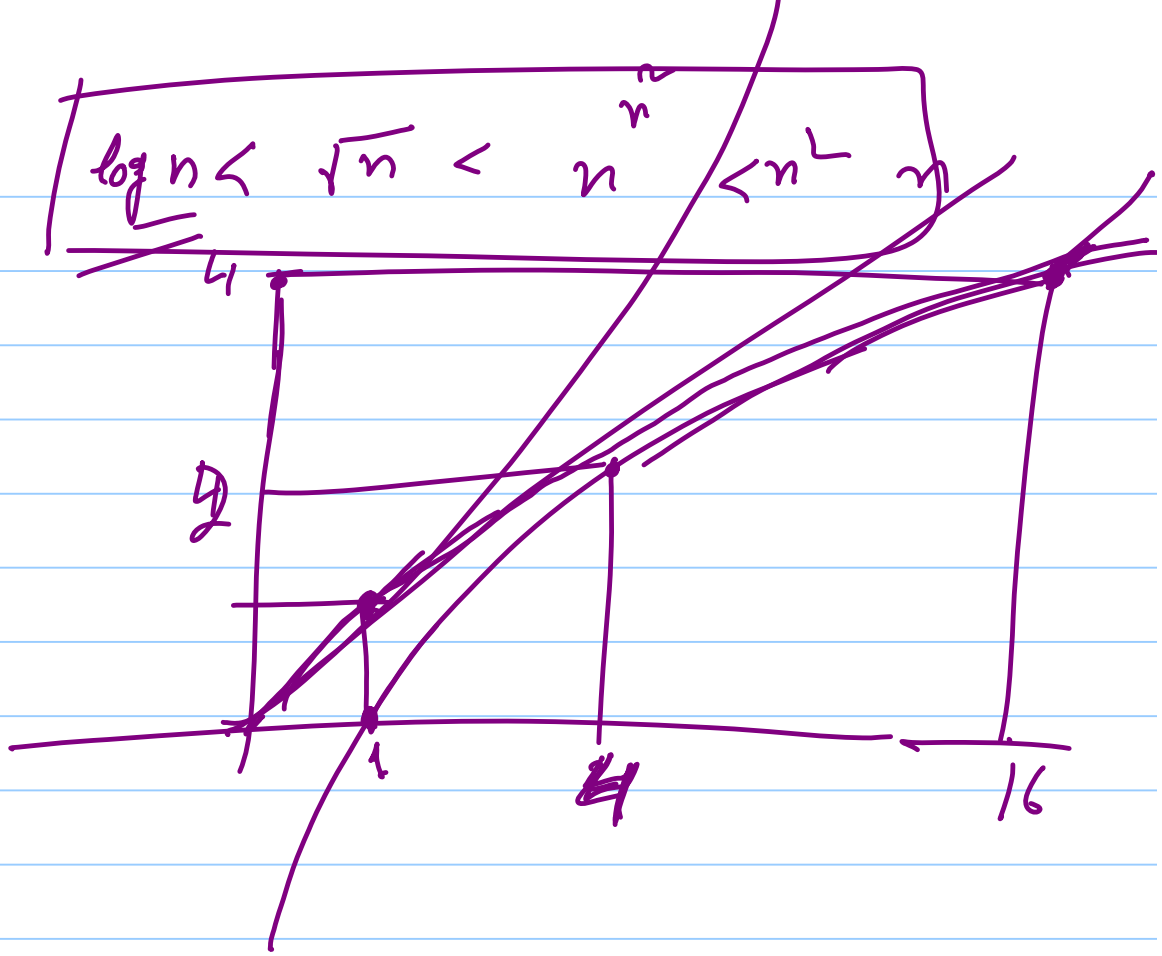
```
int fact_modified( int n) {
    int result=1,
    for (int i=1; i<=n ;i++) {
```

```
int fact_modified(int n) {
    int result=1;
    for(int i=1; i<=n; i++) {
        result= result * i;
        cout<< "factorial of i"
            << i << " is "
            << result << endl;
    }
}  return 0;
```

```
int main() {
    int n;
    cin >> n;
    fact_modified(n);
    return 0;
}
```

$K + 3n + 2$
$= O(n)$


an²+bn+c
1
O(n)
2
3
O(n²)
4
2n
2n+100
2n²
n²+5n
n=1
20
102
2
6
1
n=5
100
110
50
50
1
n=10
200
120
200
150
n=100
2000
300
20000
10,500
n=10000
20,000,0
20,000+100
10000 00000
10000 00000
+7100


$\log n < \sqrt{n} < n^n < n^2 < n!$
4
2
1
4
16