

OBLIG_1

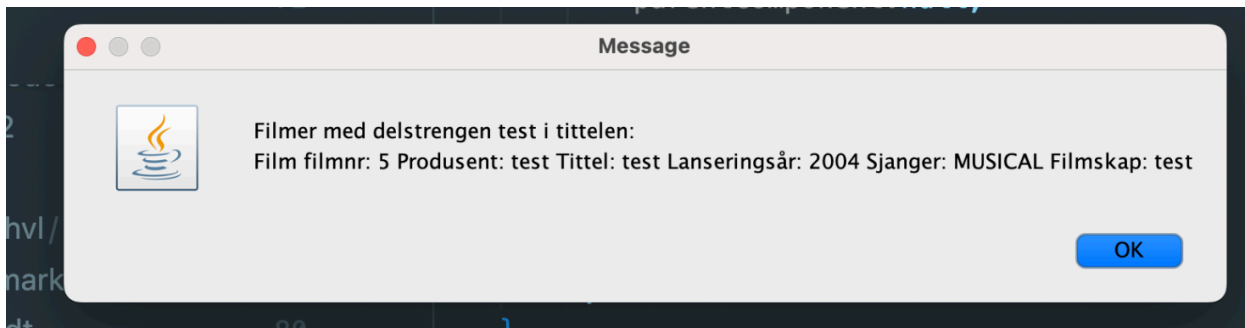
Gruppe 41

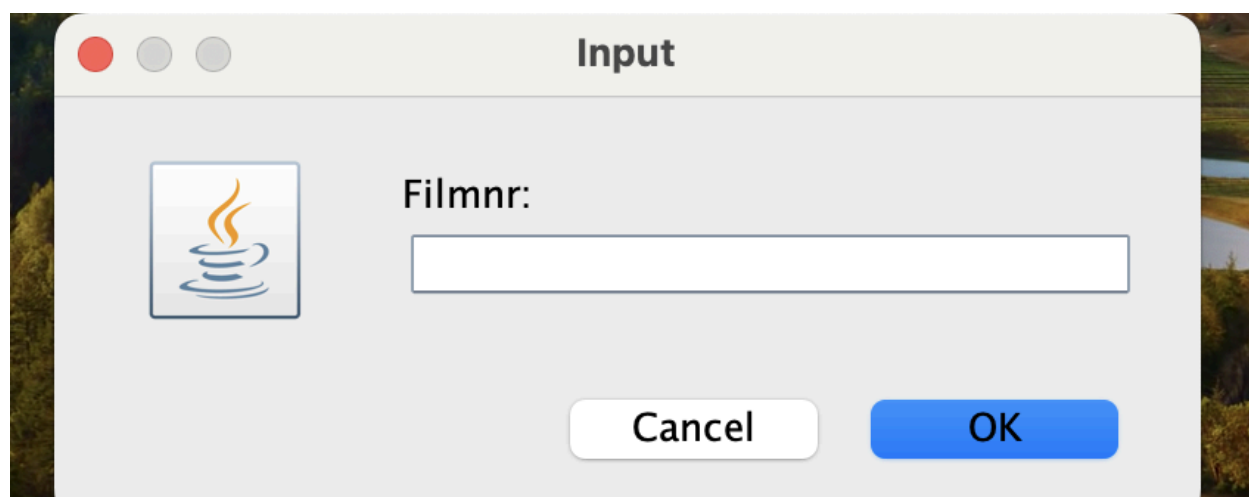
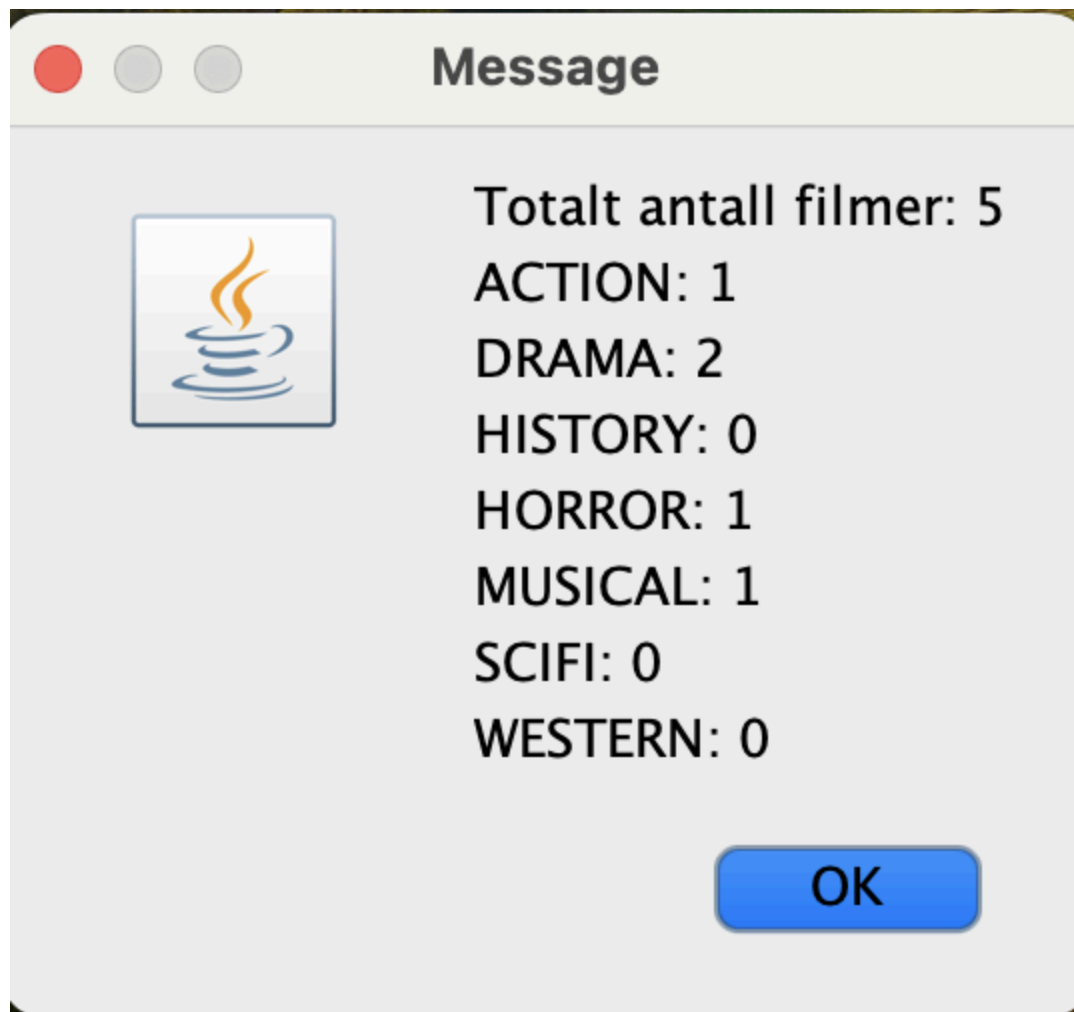
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Del 1







Del 2

Oppgave 3a

vi finner fortest økende ledd og skriver det med O notasjon

i $4n^2 + 50 - 10 = O(n^2)$

ii $10n + 4\log_2 n + 30 = O(n)$

iii $13n^3 + 22n^2 + 50n + 20 = O(n^3)$

iiii $35 + 13\log_2 n = O(\log n)$

Oppgave 3 b)

$O(\log_2(n))$ grunnet at det er antall ganger n kan halveres før den er tilnærmet 0.

Oppgave 3c)

$O(n \log^2(n))$ grunnet at ytre løkke er $O(n)$ og indre er $O(\log(n))$.

Oppgave 3d

$$\text{Areal} = O(r)$$

$$\text{Omkrets} = O(r^2)$$

Oppgave 3e

$$(n - 2)(n) = O(n^2)$$

Begrunn svaret:

$O(n^2)$ er verste tilfellet siden den må gå gjennom alle plassene i tabellen

Oppgave 3f

$$\text{i} \quad t_1(n) = 8n + 4n^2 = O(n^2)$$

$$\text{ii} \quad t_2(n) = 10 \log_2 n + 20 = O(\log_2 n)$$

$$\text{iii} \quad t_3(n) = 20n + 2n \log_2 n + 11 = O(n \log_2 n)$$

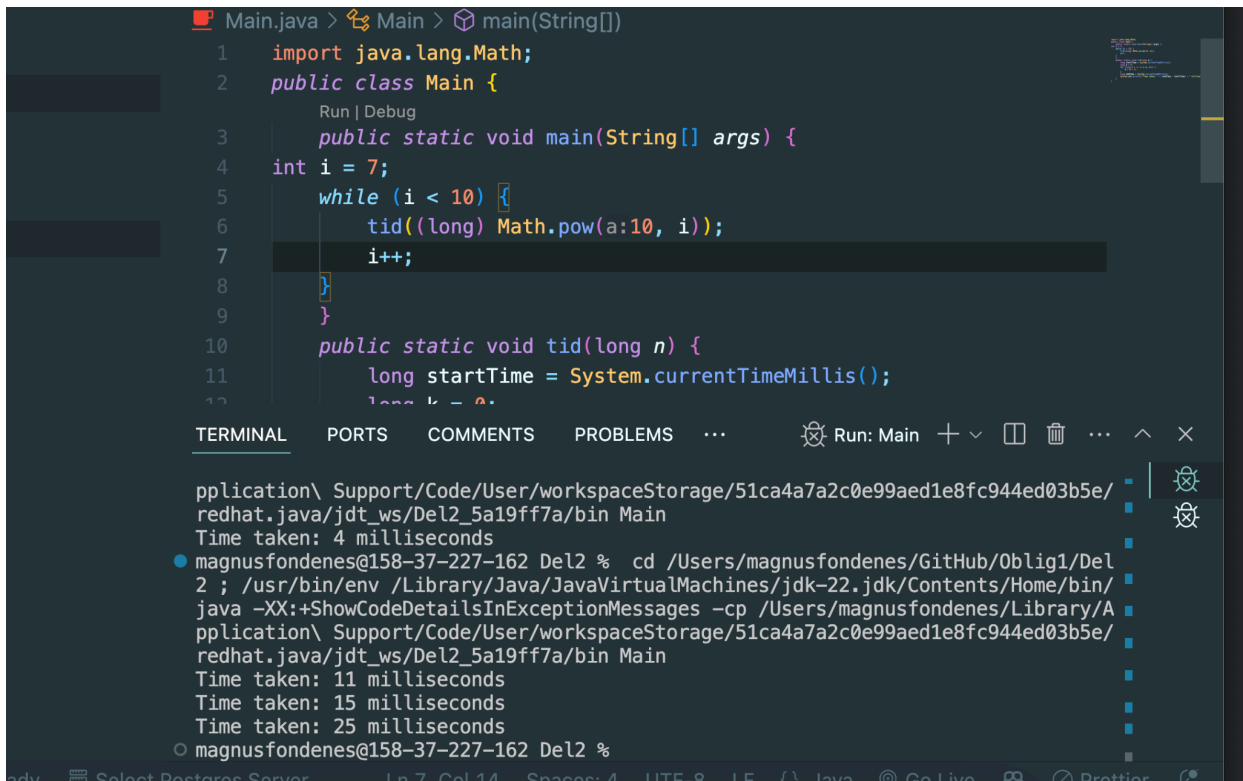
$$\text{iv} \quad t_4(n) = 4 \log_2 n + 2n = O(n)$$

Raking

1. t_2
2. t_4
3. t_3

4. t1

Oppgave 3g



The screenshot shows an IDE with a Java file named Main.java. The code defines a class Main with a main method and a recursive method tid. The main method calls tid with Math.pow(10, i). The terminal shows the execution of the program, displaying the time taken for each recursive call.

```
Main.java > Main > main(String[])
1  import java.lang.Math;
2  public class Main {
3      public static void main(String[] args) {
4      int i = 7;
5      while (i < 10) {
6          tid((long) Math.pow(10, i));
7          i++;
8      }
9      }
10     public static void tid(long n) {
11         long startTime = System.currentTimeMillis();
12         long k = n;
```

TERMINAL

```
pplication\ Support\Code\User\workspaceStorage\51ca4a7a2c0e99aed1e8fc944ed03b5e/
redhat.java/jdt_ws/Del2_5a19ff7a/bin Main
Time taken: 4 milliseconds
● magnusfondenes@158-37-227-162 Del2 % cd /Users/magnusfondenes/GitHub/Oblig1/Del
2 ; /usr/bin/env /Library/Java/JavaVirtualMachines/jdk-22.jdk/Contents/Home/bin/
java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/magnusfondenes/Library/A
pplication\ Support\Code\User\workspaceStorage\51ca4a7a2c0e99aed1e8fc944ed03b5e/
redhat.java/jdt_ws/Del2_5a19ff7a/bin Main
Time taken: 11 milliseconds
Time taken: 15 milliseconds
Time taken: 25 milliseconds
○ magnusfondenes@158-37-227-162 Del2 %
```

$$T(n) = cn$$

begrunnelse: det stemmer overens med testene siden det er liten økning i tid mellom selv om tallet blir eksponentielt større.