

Gebze Technical University
Computer Engineering

MAT 214
2017 Spring

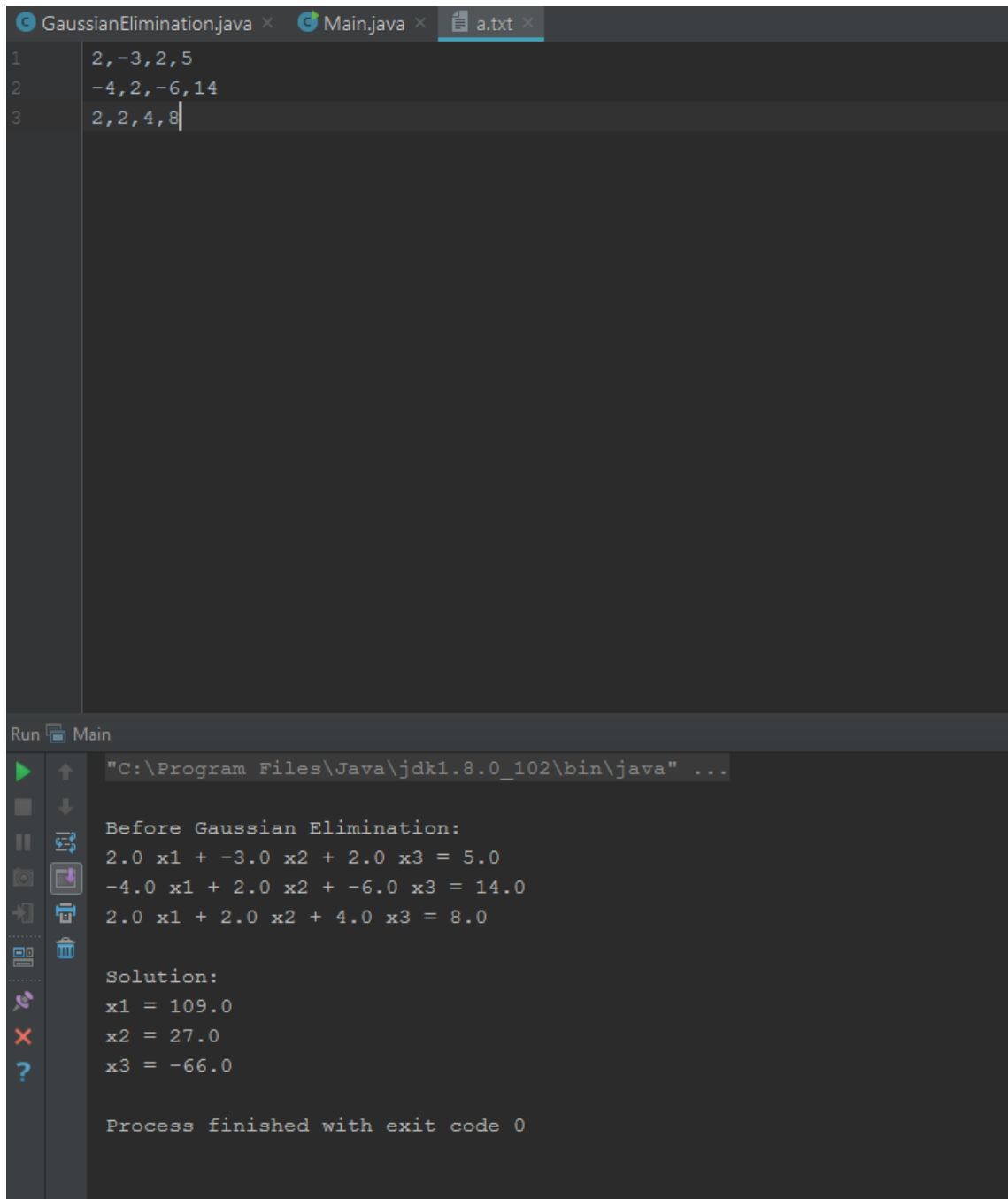
HOMEWORK 02 REPORT

Elif Şeyma ARMAĞAN
151044042

Educator:
Erchan APTOULA

PART 1

6.2 – C deki örnek için programın çıktısı (Gaussian Elimination)



```
GaussianElimination.java x Main.java x a.txt x
1 2,-3,2,5
2 -4,2,-6,14
3 2,2,4,8

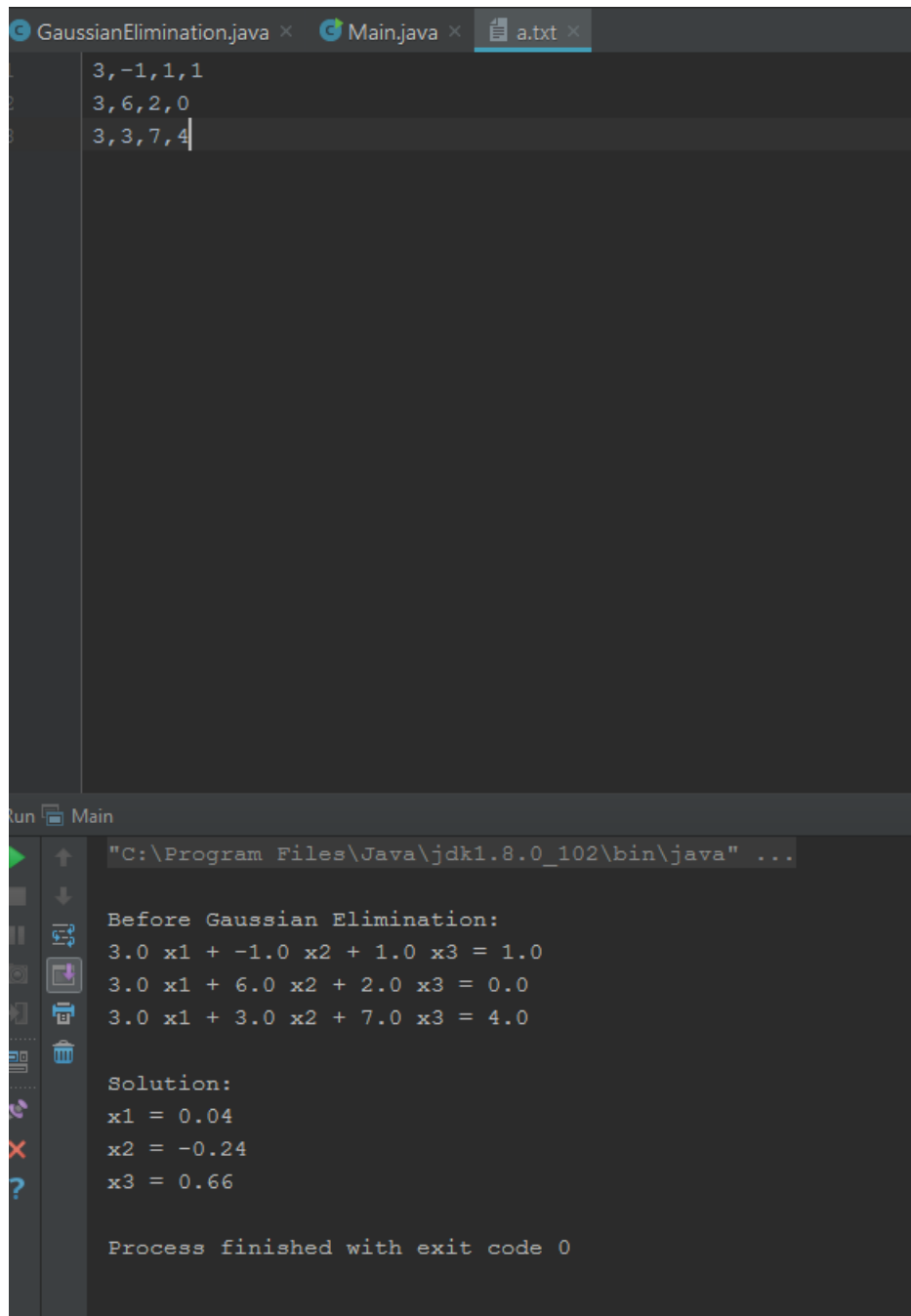
Run Main
"C:\Program Files\Java\jdk1.8.0_102\bin\java" ...

Before Gaussian Elimination:
2.0 x1 + -3.0 x2 + 2.0 x3 = 5.0
-4.0 x1 + 2.0 x2 + -6.0 x3 = 14.0
2.0 x1 + 2.0 x2 + 4.0 x3 = 8.0

Solution:
x1 = 109.0
x2 = 27.0
x3 = -66.0

Process finished with exit code 0
```

7.3 – 1.A daki örnek için programın çıktısı (Gaussian Elimination)



The screenshot shows an IDE with three tabs: `GaussianElimination.java`, `Main.java`, and `a.txt`. The `a.txt` tab is active and contains the following matrix entries:

```
3, -1, 1, 1
3, 6, 2, 0
3, 3, 7, 4
```

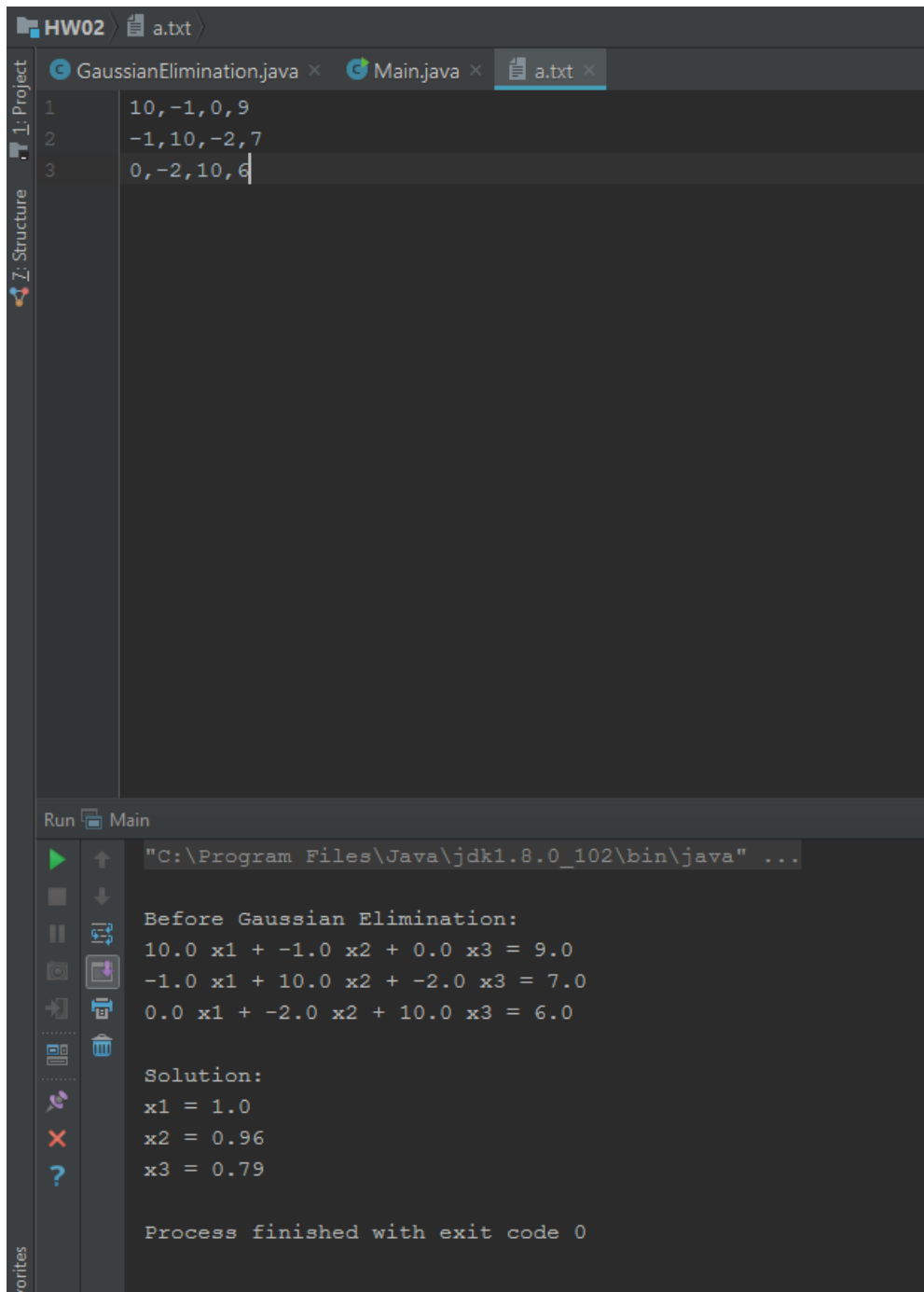
Below the editor, the `Run` tab is active, showing the command `"C:\Program Files\Java\jdk1.8.0_102\bin\java" ...` and the program's output:

```
Before Gaussian Elimination:
3.0 x1 + -1.0 x2 + 1.0 x3 = 1.0
3.0 x1 + 6.0 x2 + 2.0 x3 = 0.0
3.0 x1 + 3.0 x2 + 7.0 x3 = 4.0

Solution:
x1 = 0.04
x2 = -0.24
x3 = 0.66

Process finished with exit code 0
```

7.3 – 1.B deki örnek için programın çıktısı (Gaussian Elimination)



The screenshot shows an IDE with a project named 'HW02'. The 'a.txt' file is open, containing three lines of input data for Gaussian elimination:

```
1 10,-1,0,9
2 -1,10,-2,7
3 0,-2,10,6
```

The 'Run' console shows the execution of the program. The output is as follows:

```
Run Main
"C:\Program Files\Java\jdk1.8.0_102\bin\java" ...

Before Gaussian Elimination:
10.0 x1 + -1.0 x2 + 0.0 x3 = 9.0
-1.0 x1 + 10.0 x2 + -2.0 x3 = 7.0
0.0 x1 + -2.0 x2 + 10.0 x3 = 6.0

Solution:
x1 = 1.0
x2 = 0.96
x3 = 0.79

Process finished with exit code 0
```

PART 2

$$\begin{array}{ccccc} a_{11} & a_{12} & a_{13} & x & x' \\ a_{21} & a_{22} & a_{23} & * & y = y' \\ 0 & 0 & 1 & 1 & 1 \end{array}$$

(x,y) ikilisini [1,2] ve (x',y') ikilisini [2,2] alırsak

$$a_{11} + 2a_{12} + a_{13} = 2$$

$$a_{21} + 2a_{22} + a_{23} = 2$$

(x,y) ikilisini [2,1] ve (x',y') ikilisini [-1,4] alırsak

$$2a_{11} + a_{12} + a_{13} = -1$$

$$2a_{21} + a_{22} + a_{23} = 4$$

(x,y) ikilisini [3,1] ve (x',y') ikilisini [-4,4] alırsak

$$3a_{11} + a_{12} + a_{13} = -4$$

$$3a_{21} + a_{22} + a_{23} = 4$$

a₁₁, a₁₂ ve a₁₃ ü gruplandırırız

$$6a_{11} + 4a_{12} + 3a_{13} = -3$$

a₂₁, a₂₂ ve a₂₃ ü gruplandırırız

$$6a_{21} + 4a_{22} + 3a_{23} = 10$$

a₁₁, a₁₂ ve a₁₃ için matris yaparsak

$$\begin{array}{cccc} 1 & 2 & 1 & 2 \\ 2 & 1 & 1 & -1 \\ 3 & 1 & 1 & 4 \end{array}$$

A MATRİSİ

a₂₁, a₂₂ ve a₂₃ için matris yaparsak

$$\begin{array}{cccc} 1 & 2 & 1 & 2 \\ 2 & 1 & 1 & 4 \\ 3 & 1 & 1 & 4 \end{array}$$

B MATRİSİ

$a_{11} = -3$, $a_{12} = 0$ ve $a_{13} = 5$ dir.

B Matrisi

$$\begin{bmatrix} -3 & 0 & 5 \\ 0 & -2 & 6 \\ 0 & 0 & 1 \end{bmatrix}$$
 matrisi oluşur.

Sol tarafta kendi matrisimiz bulunmalı ve sağ tarafa da birim matrisi eklemeliyiz. İkisini tek bir matris gibi düşünüp sol tarafı birim matrise çevirirsek sağ taraf da bize tersini verecektir.

$$\begin{bmatrix} -3 & 0 & 5 & 1 & 0 & 0 \\ 0 & -2 & 6 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{bmatrix} \quad R1 = R1 / -3 \gggggg \gg \begin{bmatrix} 1 & 0 & -5/3 & -1/3 & 0 & 0 \\ 0 & -2 & 6 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}$$

$$R2 = R2 / -2 \gggggg \begin{bmatrix} 1 & 0 & -5/3 & -1/3 & 0 & 0 \\ 0 & -2 & 6 & 0 & -0.5 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}$$

$$R1 = R1 + 5R3 / 3 \gggggg \begin{bmatrix} 1 & 0 & 0 & -\frac{1}{3} & 0 & \frac{5}{3} \\ 0 & 1 & 0 & 0 & -0.5 & 3 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}$$

Buradan $A^{-1} = \begin{bmatrix} -1/3 & 0 & 5/3 \\ 0 & -0.5 & 3 \\ 0 & 0 & 1 \end{bmatrix}$ elde edilir.