Week 2 – Logic

Student number: 588406

Assignment 2.1: Parking lot

Which gates do you need?

You need a 3-input AND gate.
Because the parking is full only if:
FULL $= A \wedge B \wedge C$

Complete this table

Parking lot 1	Parking lot 2	Parking lot 3	Result (full) 1
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

Assignment 2.2: Android or iPhone

Which gates do you need?

You need an XOR gate**.**
Reason:

- If the employee chooses Android = 1 and iPhone = 0, the output = 1
- If the employee chooses Android = 0 and iPhone = 1, the output = 1
- If the employee chooses both or none, the output = 0

This matches the XOR behavior.

Complete this table

- **A = Android chosen**
- **B = iPhone chosen**
- **Y = Valid choice** (output that is 1 only when exactly one is chosen)

Android phone	iPhone	Result (Phone in possession)
0	0	0
0	1	1
1	0	1

1	1	0

Assignment 2.3: Four NAND gates

Complete this table

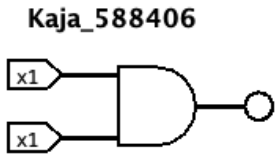
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

How can the design be simplified?

This circuit works like an XOR gate. So instead of using 4 NAND gates, you can use 1 XOR gate**.**

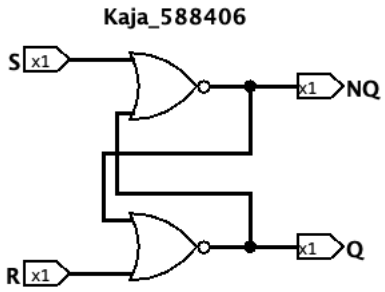
Assignment 2.4: Getting to know Logisim evolution

Screenshot of the design with your name and student number in it:



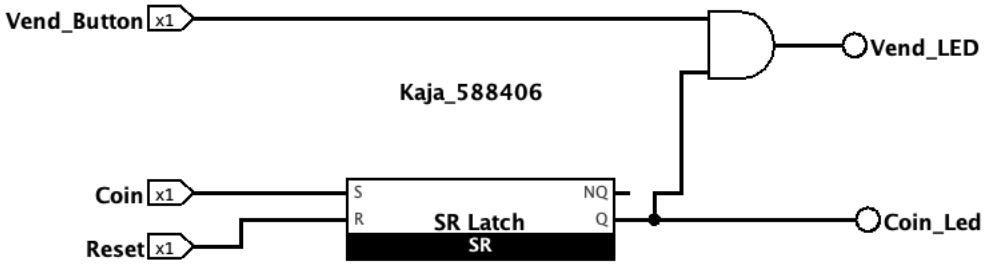
Assignment 2.5: SR Latch

Screenshot SR Latch in Logisim with your name and student number:



Assignment 2.6: Vending Machine

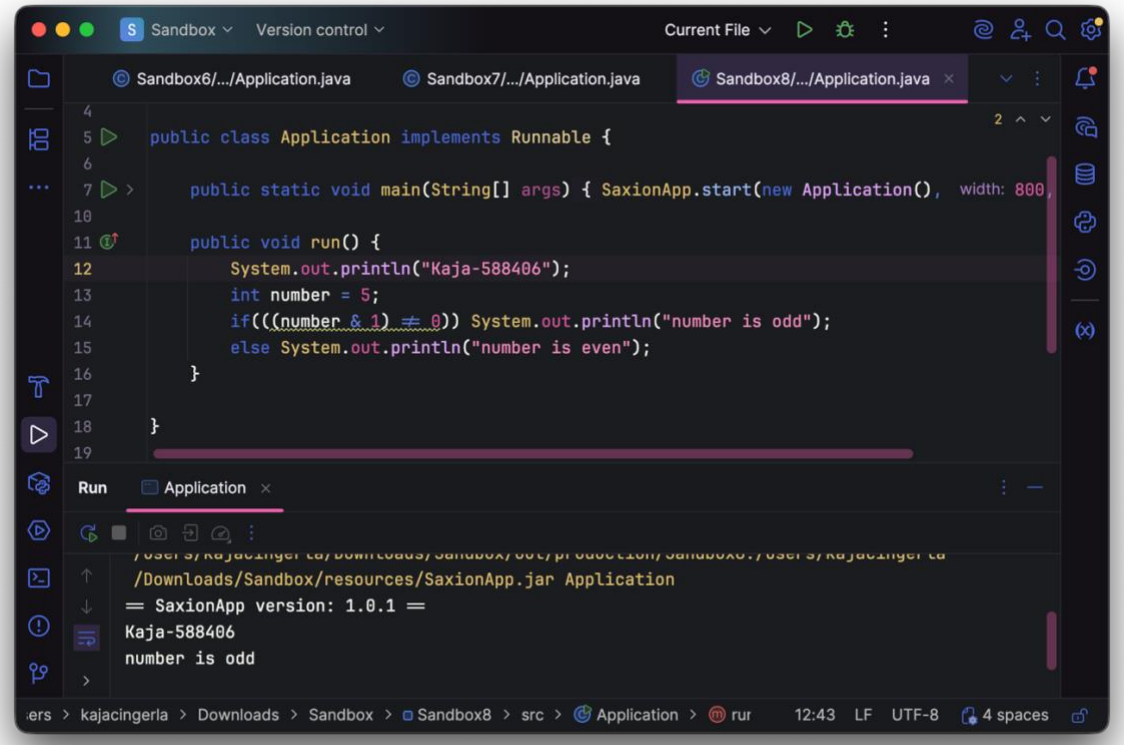
Screenshot Vending Machine in Logisim with your name and student number:



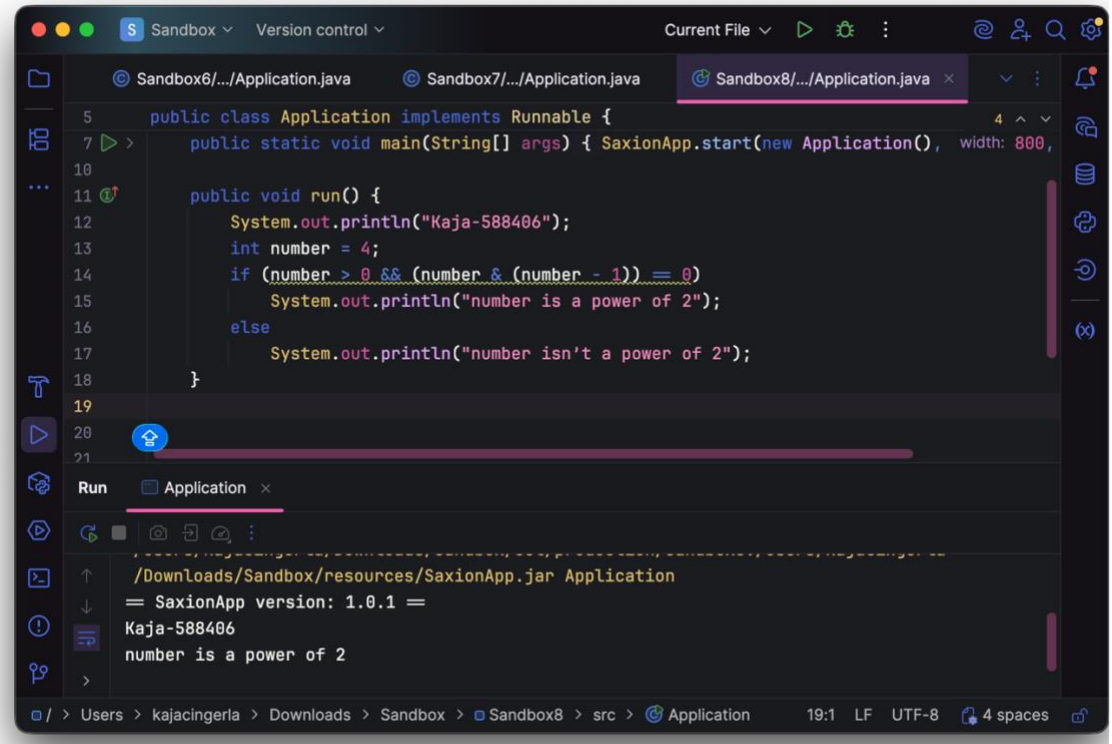
Assignment 2.7: Bitwise operators

Complete the java source code for bitwise operators. Put the source code here.

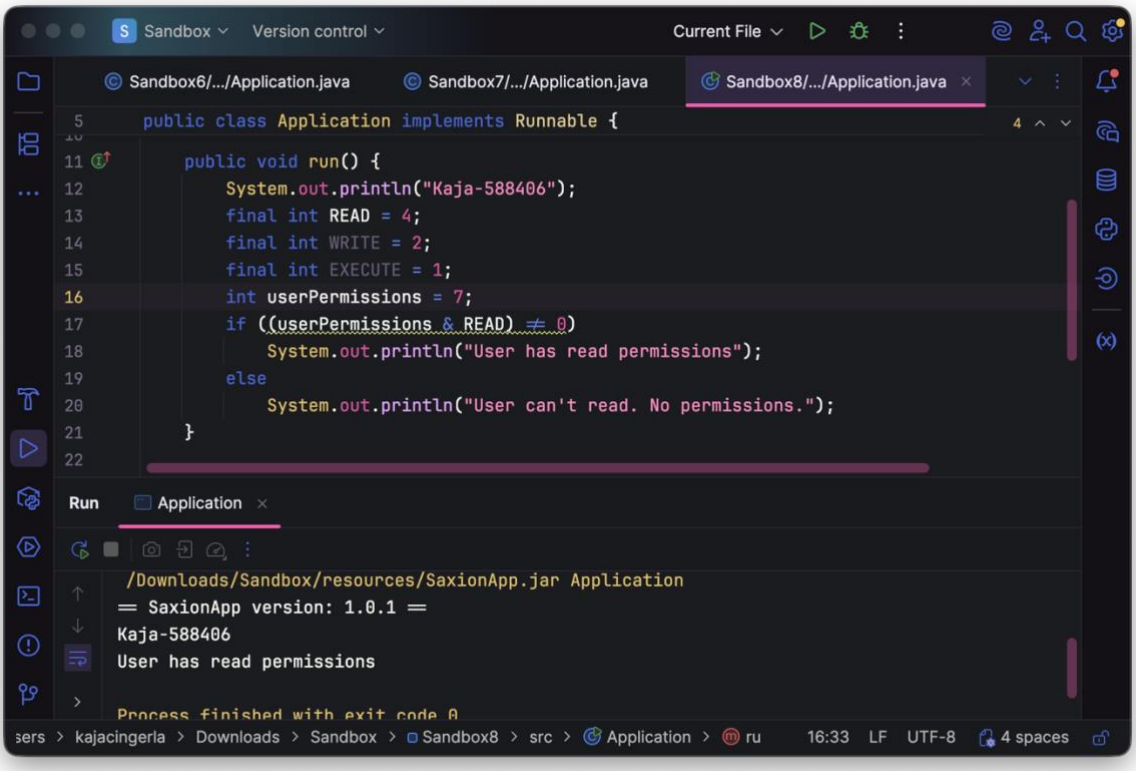
1#



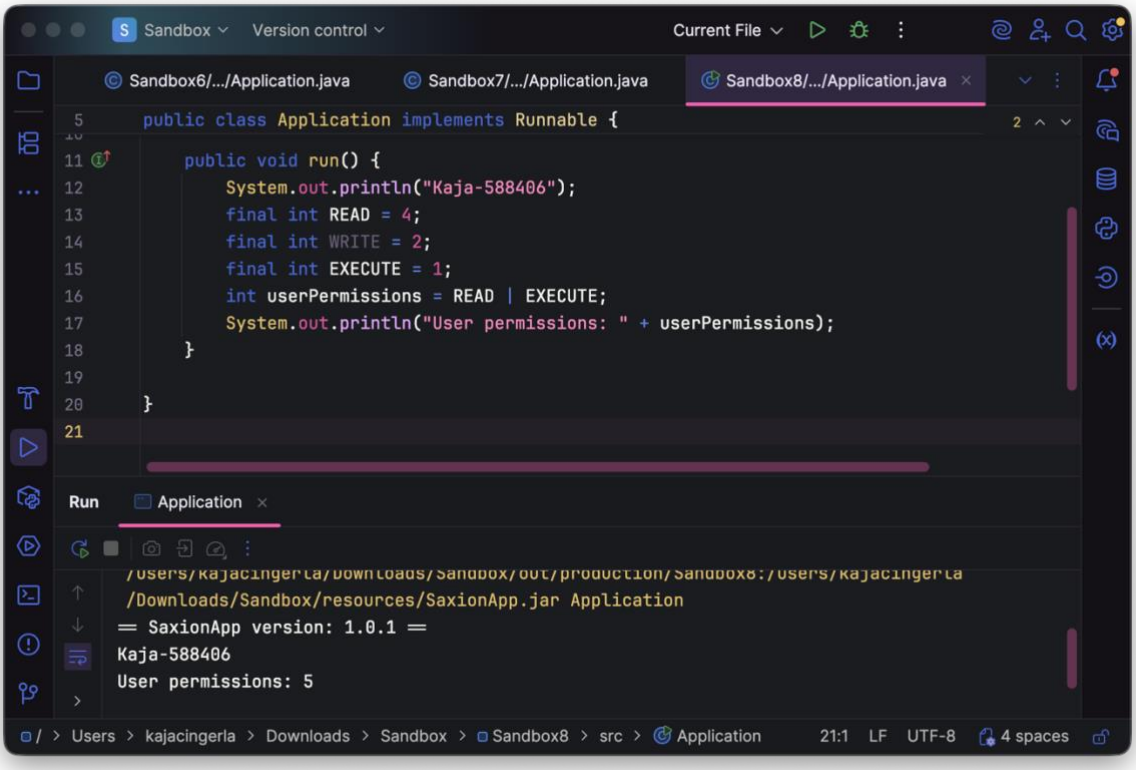
2#


Sandbox
Version control
Current File
Sandbox6/.../Application.java
Sandbox7/.../Application.java
Sandbox8/.../Application.java
public class Application implements Runnable {
public static void main(String[] args) { SaxionApp.start(new Application(), width: 800,
public void run() {
System.out.println("Kaja-588406");
int number = 4;
if (number > 0 && (number & (number - 1)) == 0)
System.out.println("number is a power of 2");
else
System.out.println("number isn't a power of 2");
}
Run
Application
/Downloads/Sandbox/resources/SaxionApp.jar Application
== SaxionApp version: 1.0.1 ==
Kaja-588406
number is a power of 2
Users > kajacingerla > Downloads > Sandbox > Sandbox8 > src > Application
19:1 LF UTF-8 4 spaces

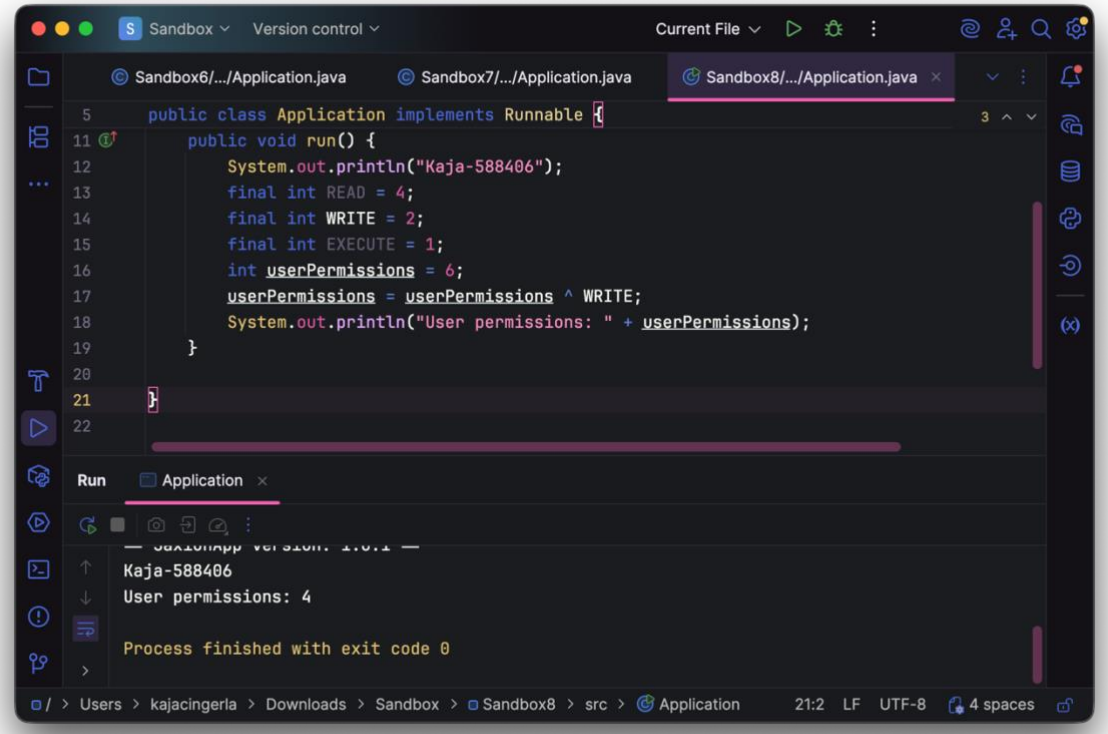
3#


Sandbox
Version control
Current File
Sandbox6/.../Application.java
Sandbox7/.../Application.java
Sandbox8/.../Application.java
public class Application implements Runnable {
public void run() {
System.out.println("Kaja-588406");
final int READ = 4;
final int WRITE = 2;
final int EXECUTE = 1;
int userPermissions = 7;
if ((userPermissions & READ) != 0)
System.out.println("User has read permissions");
else
System.out.println("User can't read. No permissions.");
}
Run
Application
/Downloads/Sandbox/resources/SaxionApp.jar Application
== SaxionApp version: 1.0.1 ==
Kaja-588406
User has read permissions
Process finished with exit code 0
sers > kajacingerla > Downloads > Sandbox > Sandbox8 > src > Application > ru
16:33 LF UTF-8 4 spaces

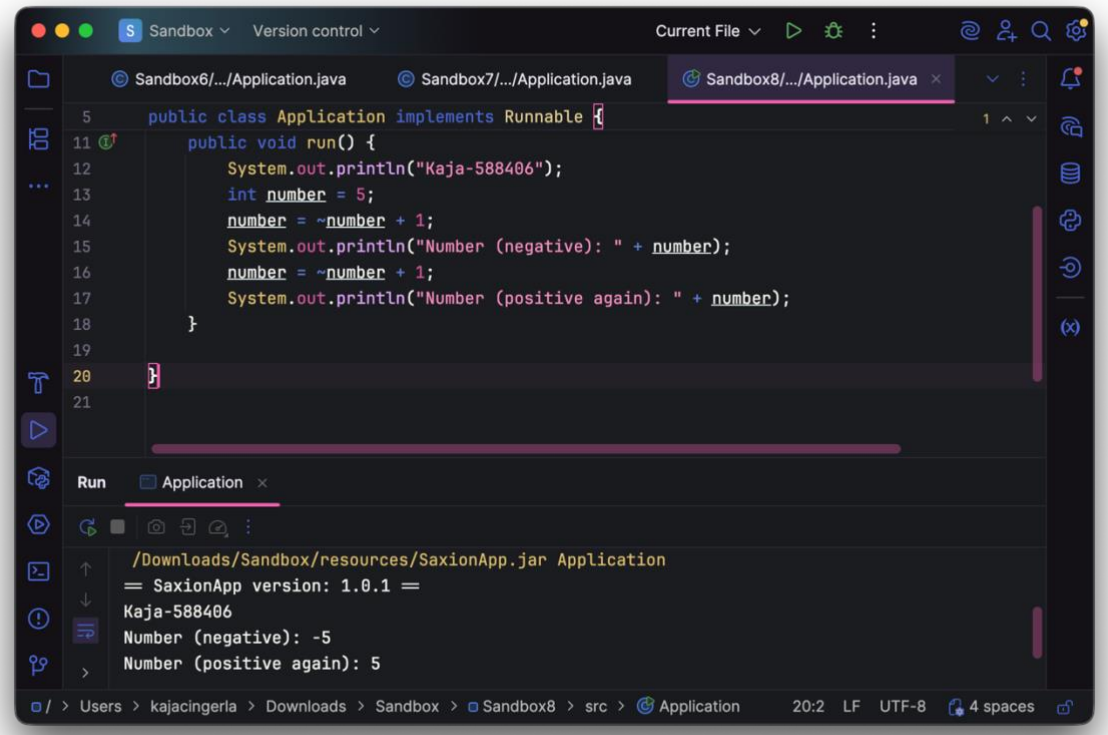
4#


Sandbox
Version control
Current File
Sandbox6/.../Application.java
Sandbox7/.../Application.java
Sandbox8/.../Application.java
public class Application implements Runnable {
public void run() {
System.out.println("Kaja-588406");
final int READ = 4;
final int WRITE = 2;
final int EXECUTE = 1;
int userPermissions = READ | EXECUTE;
System.out.println("User permissions: " + userPermissions);
}
}
Run
Application
/Downloads/Sandbox/resources/SaxionApp.jar Application
== SaxionApp version: 1.0.1 ==
Kaja-588406
User permissions: 5
Users > kajacingerla > Downloads > Sandbox > Sandbox8 > src > Application
21:1 LF UTF-8 4 spaces

5#


Sandbox
Version control
Current File
Sandbox6/.../Application.java
Sandbox7/.../Application.java
Sandbox8/.../Application.java
public class Application implements Runnable {
public void run() {
System.out.println("Kaja-588406");
final int READ = 4;
final int WRITE = 2;
final int EXECUTE = 1;
int userPermissions = 6;
userPermissions = userPermissions ^ WRITE;
System.out.println("User permissions: " + userPermissions);
}
}
Run
Application
Kaja-588406
User permissions: 4
Process finished with exit code 0
Users > kajacingerla > Downloads > Sandbox > Sandbox8 > src > Application
21:2 LF UTF-8 4 spaces

6#



Assignment 2.8: Java Application Bit Calculations

Create a java program that accepts user input and presents a menu with options.

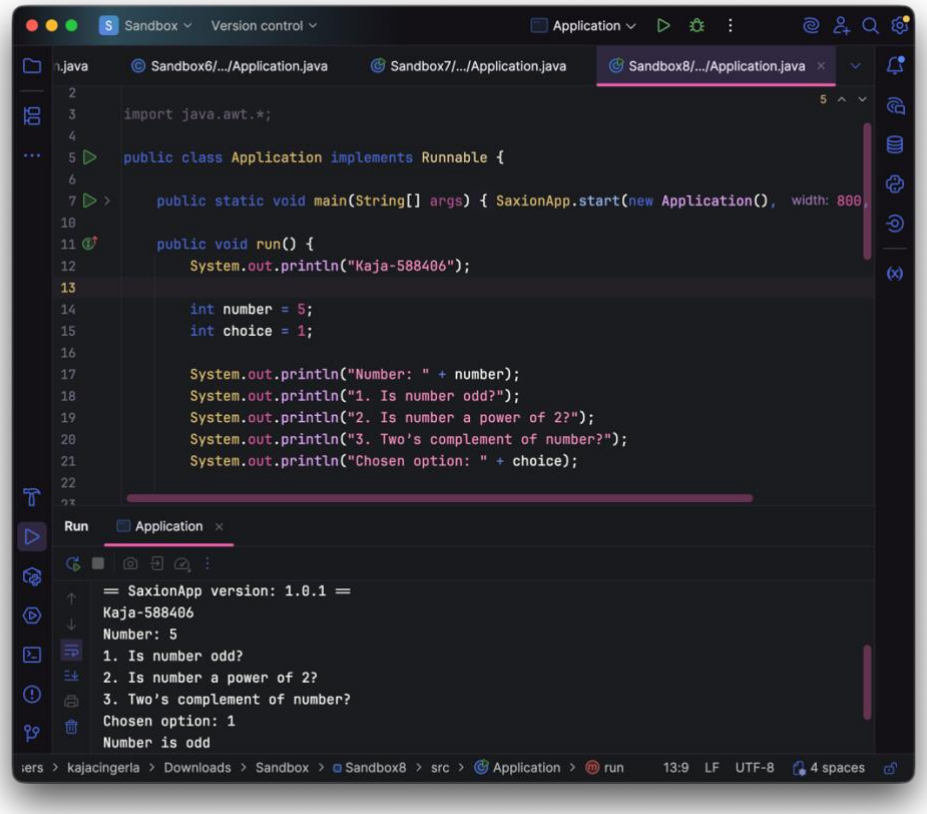
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?

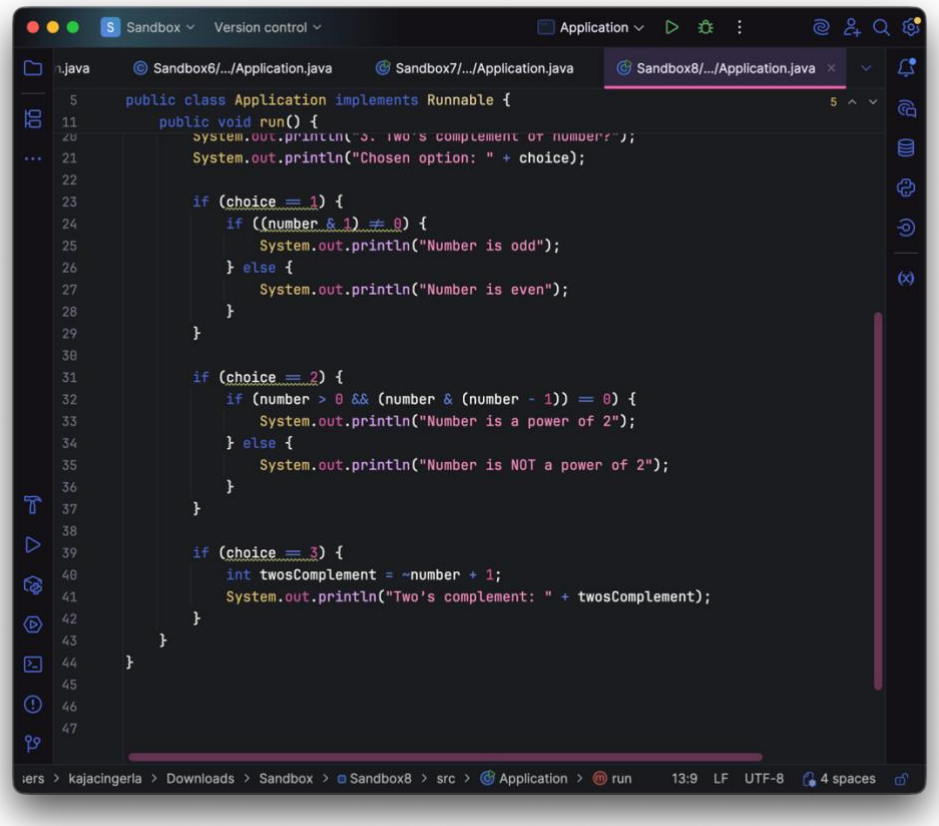
Implement the methods by using the bitwise operators you have just learned.

Organize your source code in a readable manner with the use of control flow and methods.

Keep this application because you need to expand it in week 6 for calculating network segments.

Paste source code here, with a screenshot of a working application.





Ready? Then save this file and export it as a pdf file with the name: **week2.pdf**