

Template Week 2 – Logic

Student number: 591658

Assignment 2.1: Parking lot

Which gates do you need?

AND and AND

Complete this table

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

Assignment 2.2: Android or iPhone

Which gates do you need?

XOR

Complete this table

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

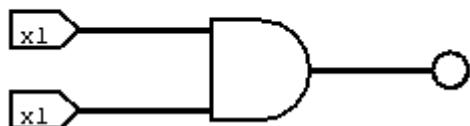
How can the design be simplified?

The design gives the same result as XOR gate does

Assignment 2.4: Getting to know Logisim evolution

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

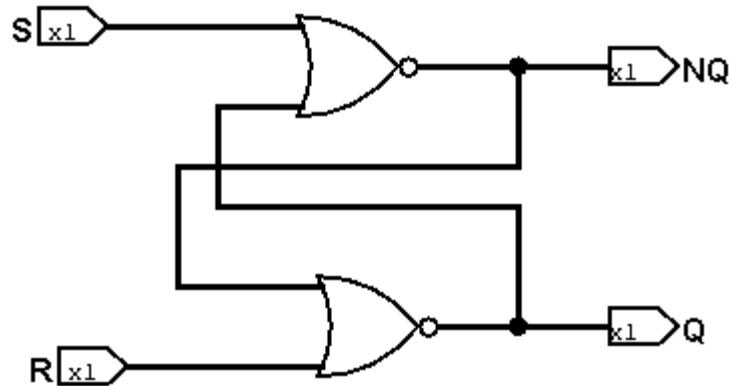
Nhi Than 591658



Assignment 2.5: SR Latch

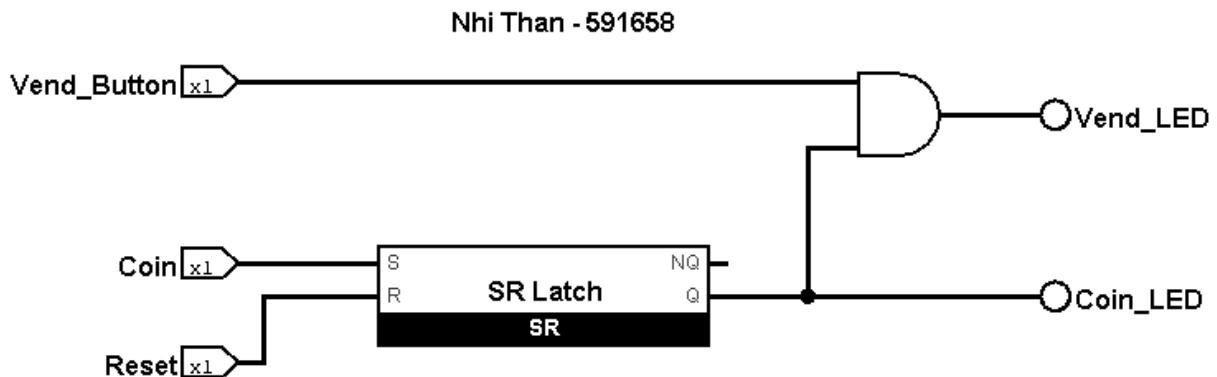
Screenshot SR Latch in Logisim with your name and student number:

Nhi Than - 591658



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 even or odd

```
public class Main {  
    public static void main(String[] args) {  
        int number = 5;  
        if((number&1)==1)  
            System.out.println("Number is odd");  
        else System.out.println("Number is even");
```

```
    }  
}
```

#2 Power of 2

```
public class Main {  
    public static void main(String[] args) {  
        int number = 4;  
        if((number&(number-1))==0&&number!=0)  
            System.out.println("Number is a power of 2");  
        else System.out.println("Number is not a power of 2");  
    }  
}
```

#3 Check permissions

```
public class Main {  
    public static void main(String[] args) {  
        final int READ = 4;  
        final int WRITE = 2;  
        final int EXECUTE = 1;  
        int userPermissions = 7;  
        if((userPermissions&READ)==READ) System.out.println("User has read permissions");  
        else System.out.println("User can't read. No permissions.");  
    }  
}
```

#4 Assign permissions

```
public class Main {  
    public static void main(String[] args) {  
        final int READ = 4;  
        final int WRITE = 2;  
        final int EXECUTE = 1;  
        int userPermissions = READ|EXECUTE;  
        System.out.println("User permissions: "+userPermissions);  
    }  
}
```

#5 Update permissions

```
public class Main {  
    public static void main(String[] args) {  
        final int READ = 4;  
        final int WRITE = 2;  
        final int EXECUTE = 1;  
        int userPermissions = 6;  
        userPermissions = userPermissions^WRITE;  
        System.out.println("User permissions: "+userPermissions);  
    }  
}
```

#6 Two's complement

```
public class Main {  
    public static void main(String[] args) {
```

```

int number = 5;
number=(~number)+1;
System.out.println("Number: "+number);
}
}

```

#7 Display binary, octal and hexadecimal values

Example code only. No requirement listed in assignment file

The screenshot shows the IntelliJ IDEA interface. In the Project tool window, there is a 'Main.java' file under the 'src' directory of the 'Fund 2.7.7' project. The code in Main.java prints the decimal, binary, octal, and hexadecimal representations of the number 10. In the Run tool window, the output shows the decimal integer as 10, followed by its binary, octal, and hexadecimal representations.

```

public class Main {
    public static void main(String[] args) {
        int number = 10;
        System.out.println("Decimal integer: " + number);
        String binary = Integer.toBinaryString(number);
        String octal = Integer.toOctalString(number);
        String hexadecimal = Integer.toHexString(number);
        System.out.println("Binary representation: " + binary);
        System.out.println("Octal representation: " + octal);
        System.out.println("Hexadecimal representation: " + hexadecimal);
    }
}

Run Main
C:\Users\ThaoN\.jdks\ms-21.0.9\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2025.2.2\lib\idea_rt.jar=6032,127.0.0.1:5005" Main
Decimal integer: 10
Binary representation: 1010
Octal representation: 12
Hexadecimal representation: a
Process finished with exit code 0

```

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.

Code:

```

import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Enter a number:");
    }
}

```

```

int number = scanner.nextInt();
printMenu();

while (true) {
    int choice = scanner.nextInt();

    if (choice == 1) {
        checkOddOrEven(number);

    } else if (choice == 2) {
        checkPowerOf2(number);

    } else if (choice == 3) {
        findTwosCompliment(number);

    } else if (choice == 4) {
        System.out.println("New number: ");
        number = scanner.nextInt();
        printMenu();

    } else if (choice == 0) {
        break;

    } else {
        System.out.println("Not valid option. Choose only 0-3");
    }
}

public static void printMenu() {
    System.out.println("Choose an option");
    System.out.println("1. Is the number odd?");
    System.out.println("2. Is number a power of 2?");
    System.out.println("3. Two's complement of number?");
    System.out.println("4. Enter a different number.");
    System.out.println("0. Exit");
}

public static void findTwosCompliment(int number) {
    int compliment = (~number) + 1;
    System.out.println("Two's complement of " + number + " is " + compliment);
}

public static void checkPowerOf2(int number) {
    if ((number & (number - 1)) == 0 && number != 0)
        System.out.println(number + " is a power of 2");
    else System.out.println(number + " is not a power of 2");
}

```

```

}

public static void checkOddOrEven(int number) {
    if ((number & 1) == 1)
        System.out.println(number + " is odd");
    else System.out.println(number + " is even");
}
}

```

Screenshot:

The screenshot shows the IntelliJ IDEA interface with the following details:

- Project Tree:** Shows the project structure with 'Fund 2.8' selected, containing 'src' which has a 'Main' class.
- Main.java Content:**

```

import java.util.Scanner;
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter a number: ");
        int number = scanner.nextInt();
    }
}

```
- Run Tab:** Set to 'Main'.
- Output Window:** Displays the application's console output:


```

C:\Users\ThaoN\.jdks\ms-21.0.9\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2025.2.2\lib\idea_rt.jar=5495
Enter a number:
3
Choose an option
1. Is the number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Enter a different number.
0. Exit
1
3 is odd
2
3 is not a power of 2
3
Two's complement of 3 is -3

```

Ready? Then save this file and export it as a pdf file with the name: [week2.pdf](#)