STMIK AMIK Bandung
Final Term Exam

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2242805

FAKULTAS INFORMATIKA
PROGRAM STUDI TEKNIK INFORMATIKA
BANDUNG

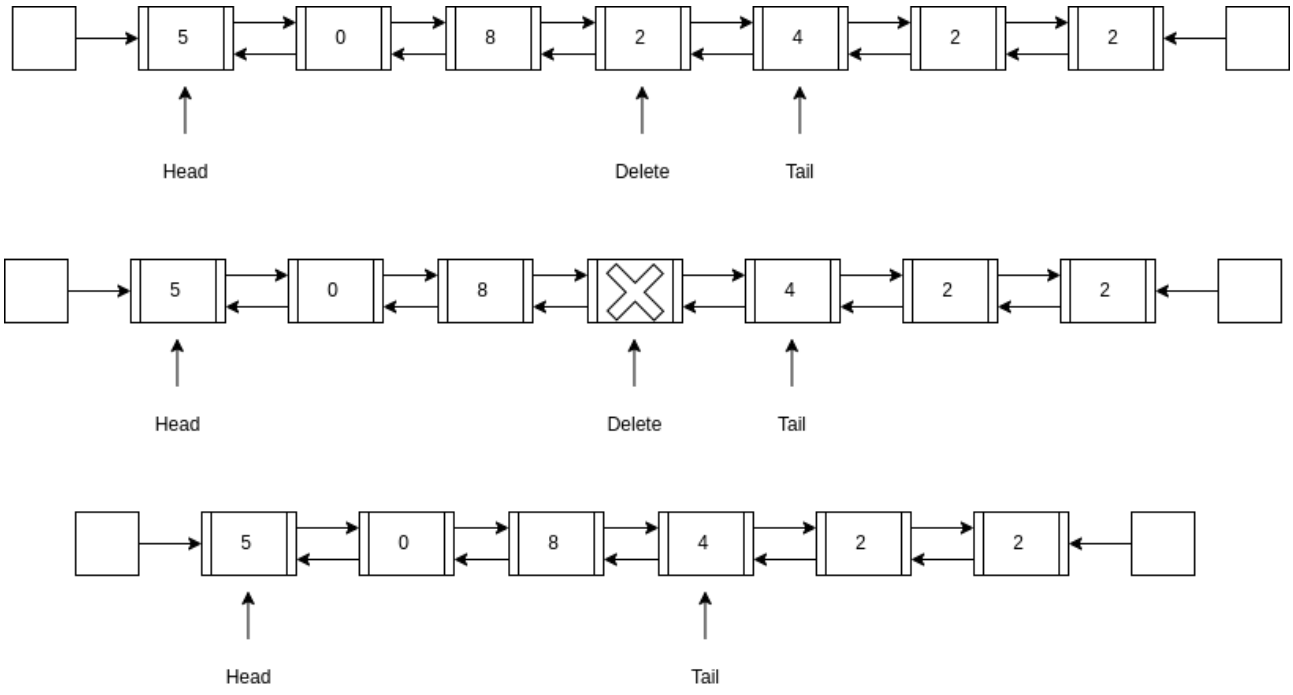
Daftar Isi

Daftar Gambar

Double linked list schema

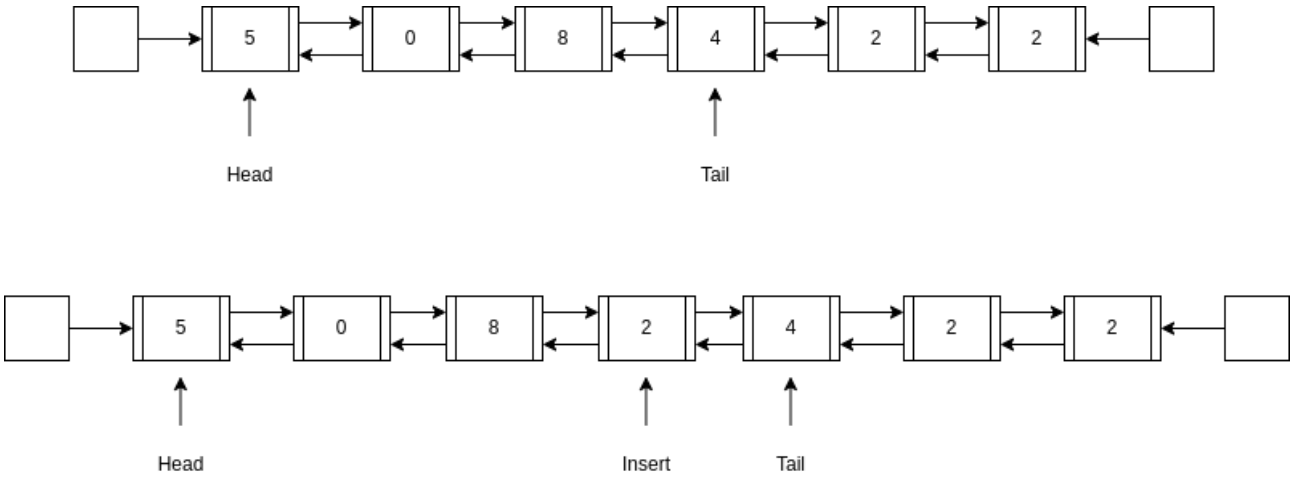
Buatlah Skema Double Linked List untuk Menghapus dan Menyisipkan Simpul/Node dari Tengah? Dengan ketentuan (Head) & (Head + Tail) untuk angkanya mengambil 6 digit NPM (dari belakang) masing-masing Mahasiswa?

1. Menghapus dari tengah



Gambar 1: Delete

2. Menambah dari tengah



Gambar 2: Insert

Array and Array list

Jelaskan perbedaan antara Array & Array List kemudian berikan contohnya dalam bentuk bahasa pemrograman Java ?

1. Perbedaan

Size: Array punya *fixed size*, sedangkan Array List mempunyai *dynamic size*
Syntax: Pengimplementasian syntax juga berbeda, jika Array `type[] arrayName` dan jika Array List `ArrayList<type> arrayListName`
Memory allocation: Array dialokasikan di lokasi memori yang berdekatan, sementara ArrayList menggunakan struktur data yang lebih kompleks secara internal untuk mengelola elemen-elemennya
Type safety: ArrayList adalah Type safety, yang berarti hanya satu jenis elemen yang dapat disimpan dalam ArrayList. Array dan dapat menyimpan beberapa jenis elemen

2. Implementasi

- Array list

```
import java.util.ArrayList;

public class ArrayListExample {
    public static void main(String[] args) {
        // Initialize an ArrayList of integers
        ArrayList<Integer> numbers = new ArrayList<Integer>();

        // Add some elements to the list
        numbers.add(1);
        numbers.add(2);
        numbers.add(3);

        // Print the list
        System.out.println("Original list: " + numbers);

        // Insert an element at the middle of the list
        numbers.add(1, 4);
        System.out.println("List after inserting element at index 1: " + numbers);

        // Remove an element from the list
        numbers.remove(2);
        System.out.println("List after removing element at index 2: " + numbers);

        // Sort the list
        numbers.sort(null);
        System.out.println("Sorted list: " + numbers);

        // Search for an element in the list
        int index = numbers.indexOf(4);
        System.out.println("Index of element 4: " + index);
    }
}
```

- Array

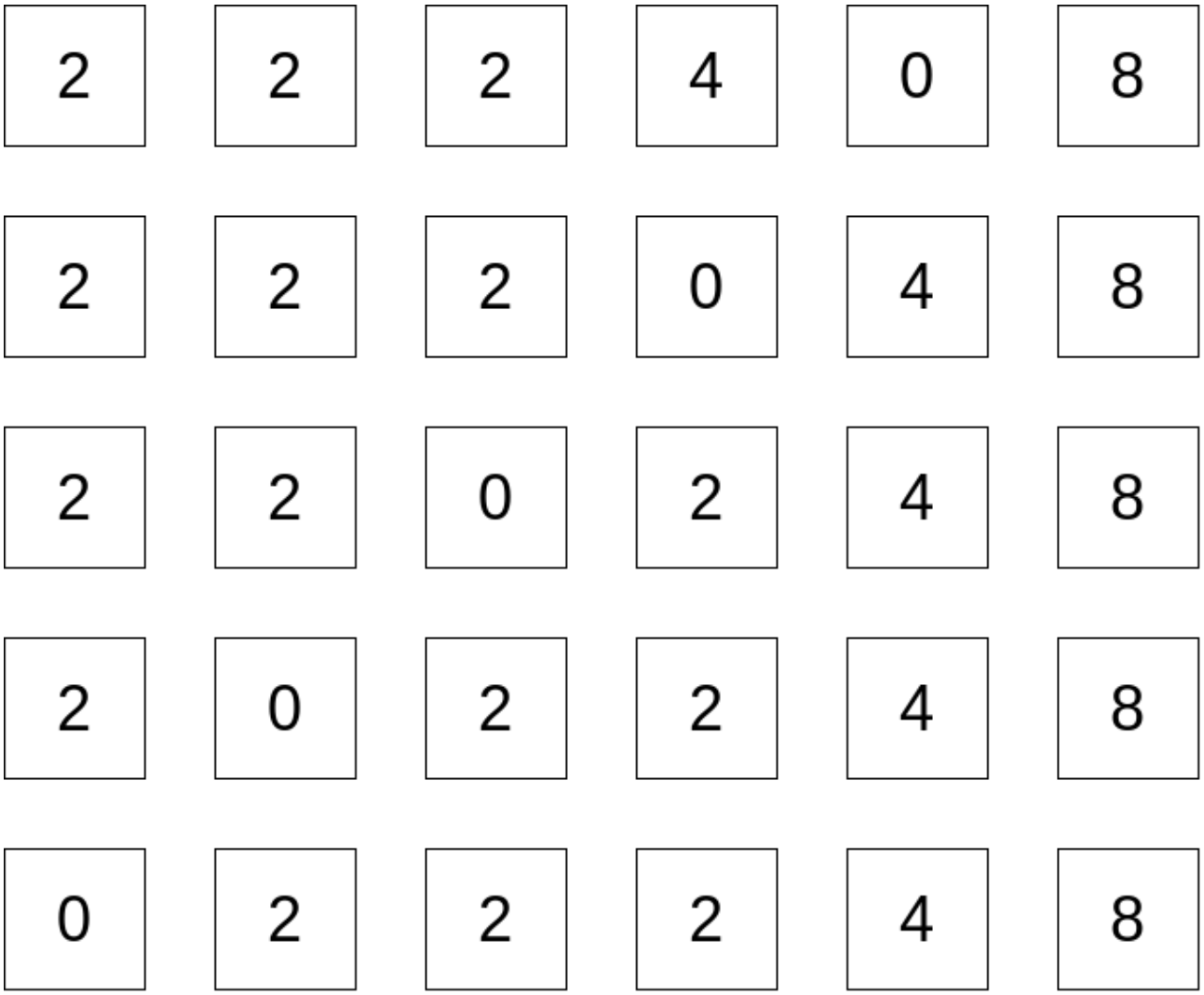
```java
public class ArrayExample {
    public static void main(String[] args) {
        // Initialize an array of integers
        int[] numbers = new int[3];

        // Add some elements to the array
        numbers[0] = 1;
        numbers[1] = 2;
        numbers[2] = 3;

        // Print the array
        System.out.print("Original array: ");
        for (int i = 0; i < numbers.length; i++) {
            System.out.print(numbers[i] + " ");
        }
        System.out.println();

        // Insert an element at the middle of the array
        int[] newNumbers = new int[numbers.length + 1];
        for (int i = 0; i < numbers.length; i++) {
            if (i < 1) {
                newNumbers[i] = numbers[i];
            } else {
                newNumbers[i + 1] = numbers[i];
            }
        }
        newNumbers[1] = 4;
        numbers = newNumbers;
        System.out.print("Array after inserting element at index 1: ");
        for (int i = 0; i < numbers.length; i++) {
            System.out.print(numbers[i] + " ");
        }
        System.out.println();

        // Sort the array
        Arrays.sort(numbers);
        System.out.print("Sorted array: ");
        for (int i = 0; i < numbers.length; i++) {
            System.out.print(numbers[i] + " ");
        }
        System.out.println();

        // Search for an element in the array
        int index = -1;
        for (int i = 0; i < numbers.length; i++) {
            if (numbers[i] == 4) {
                index = i;
                break;
```

```
            }
        }
        System.out.println("Index of element 4: " + index);
    }
}
```

Sorting method

Bubble sort

Contoh bubble sort menggunakan elemen **224280**



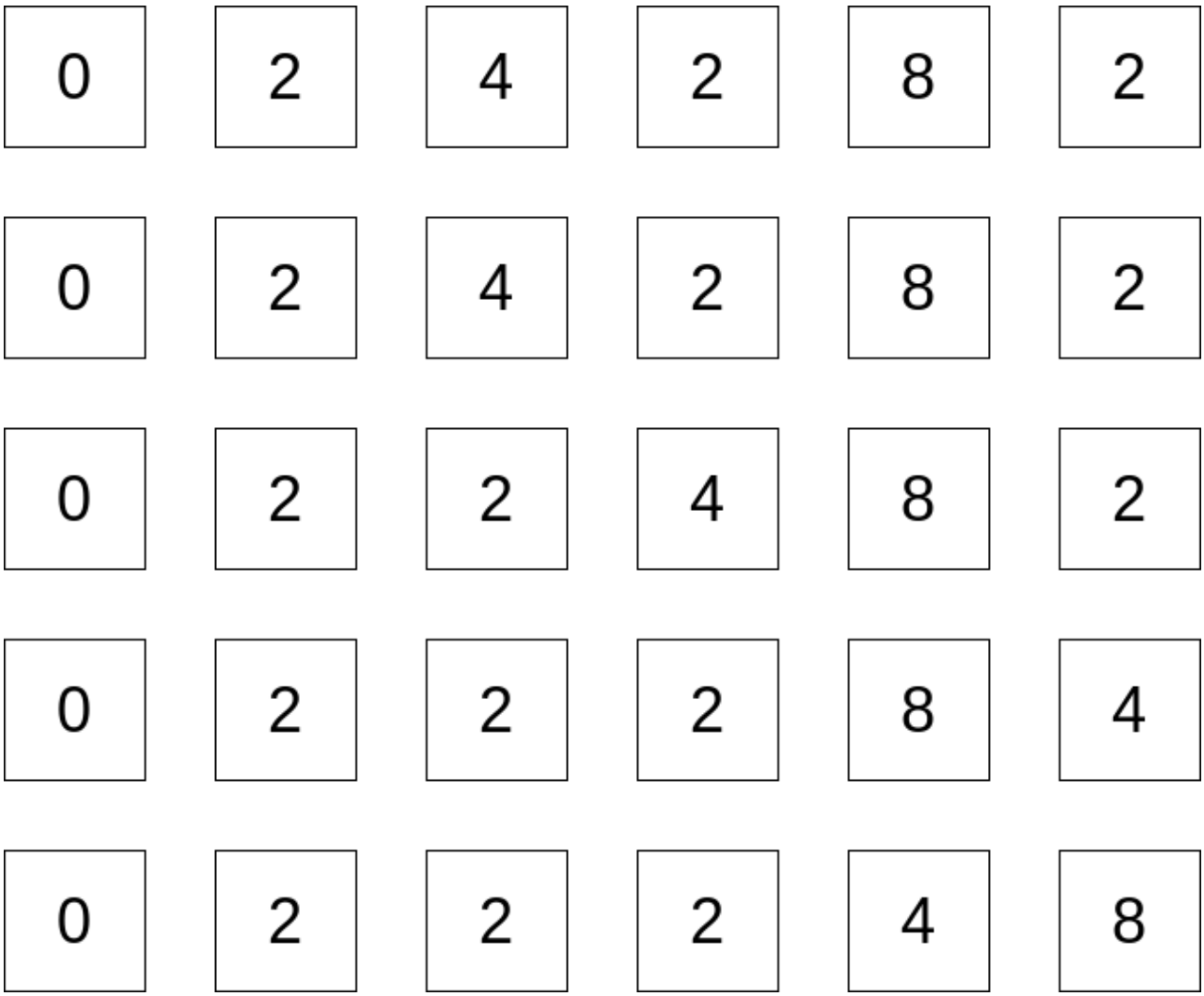
Gambar 3: Bubble sort

Selection sort

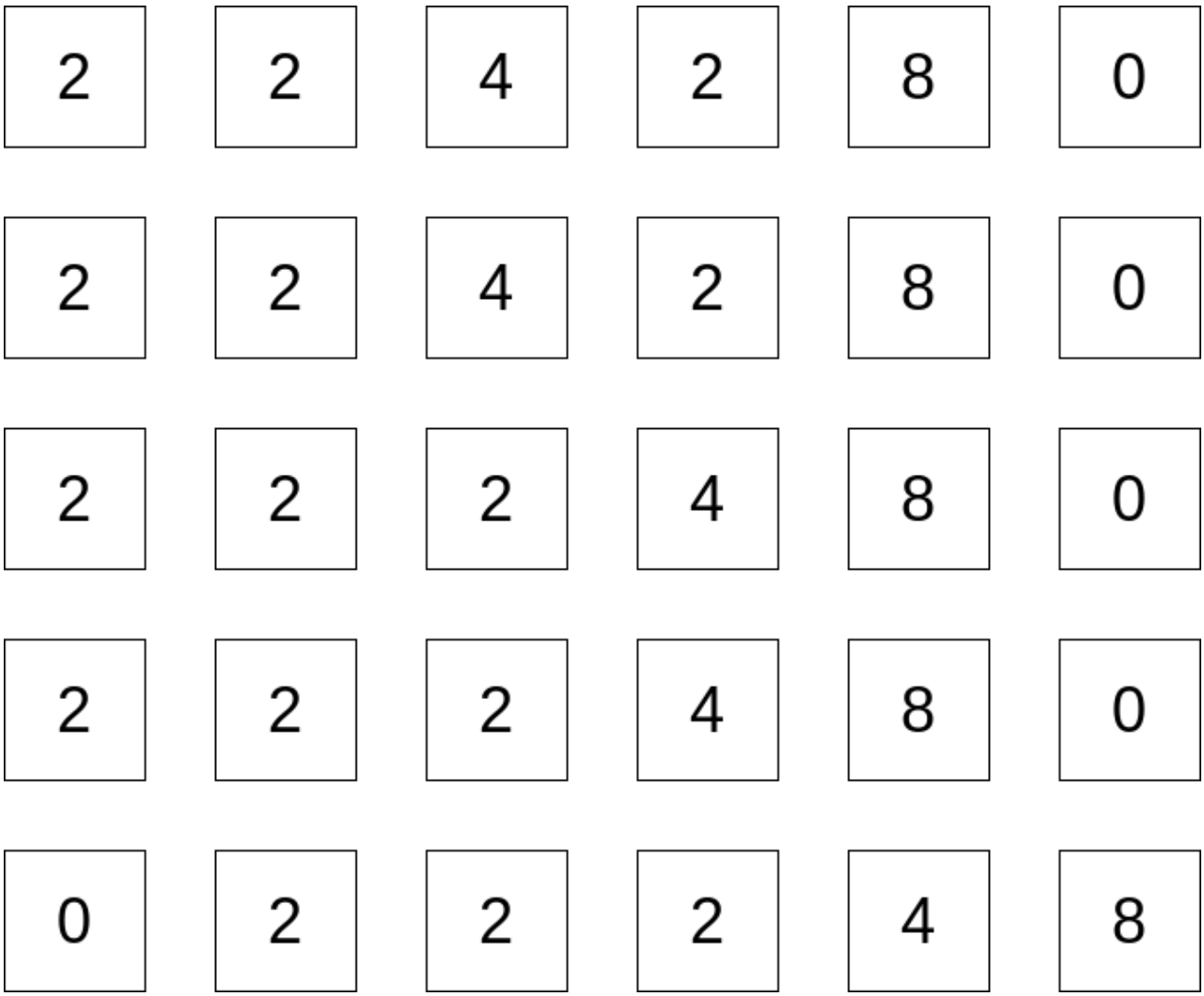
Contoh selection sort menggunakan elemen **224280**

Insertion sort

Contoh insertion sort menggunakan elemen **224280**



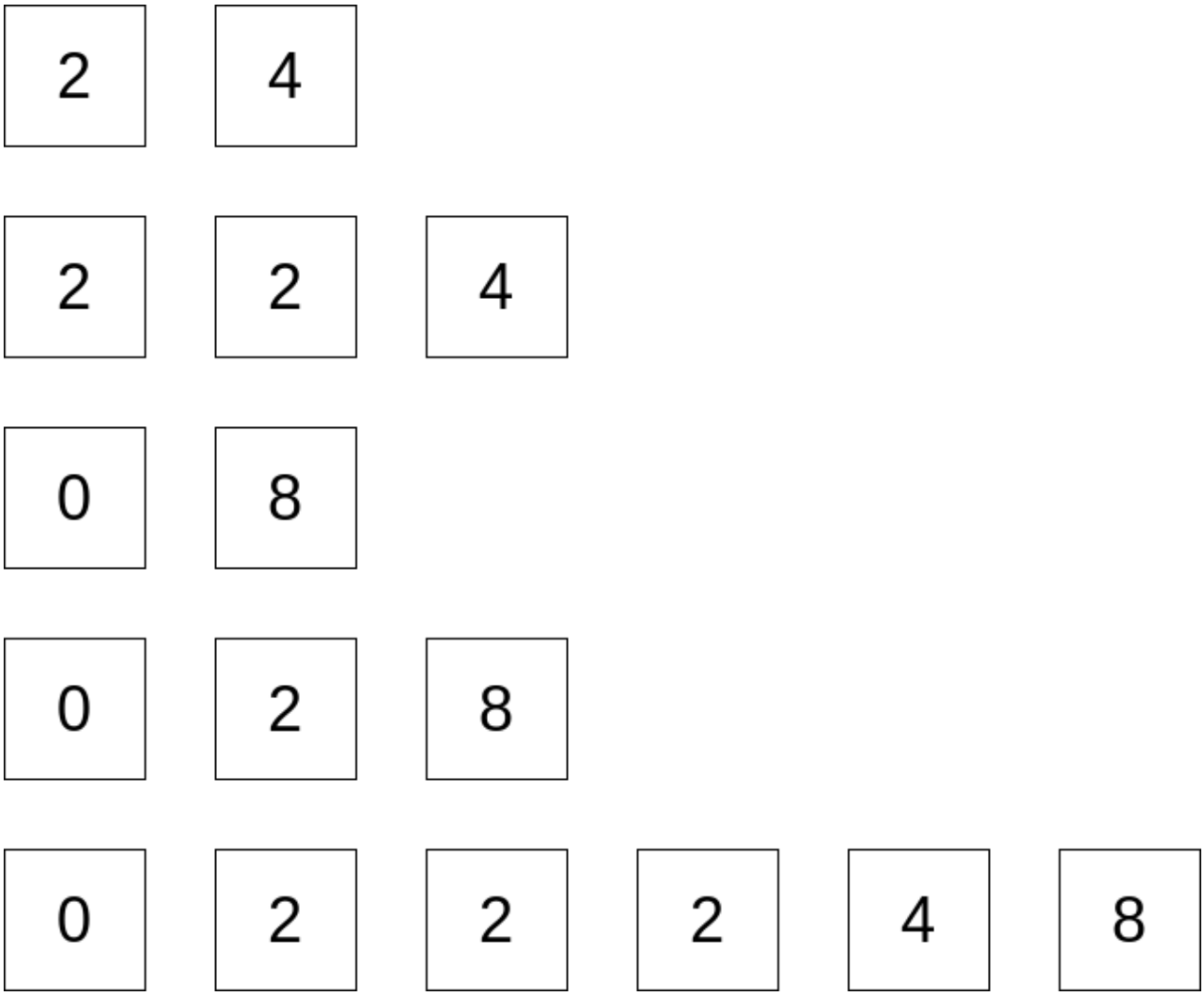
Gambar 4: Selection sort



Gambar 5: Insertion sort

Merge sort

Contoh merge sort menggunakan elemen **224280**

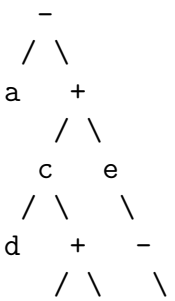


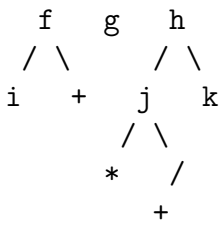
Gambar 6: Merge sort

Binary Tree

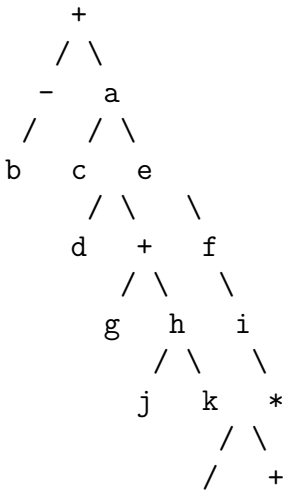
Buatlah pohon binari dengan menggunakan metode PreOrder,InOrder,PostOrder pada ekspresi berikut : - a b + c d + e + f g + h i + j k / * + -

PreOrder

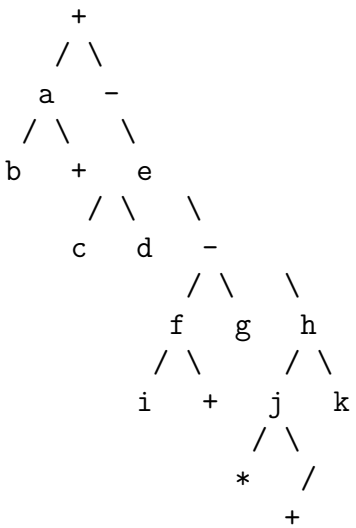




InOrder



PostOrder



Hash

Diketaui deret angka (key) : 48, 61, 27, 7, 71, 68, 34, 30, XX (2 digit paling belakang NPM) dengan kapasitas 12 dan faktor blocking=2 maka gambarkan fungsi hashnya

Hash function untuk capacity 12 dan block function 2 adalah `hash(key) = (key % 12) / 2`, maka penyelesaiannya adalah

hash(key) = (key % 12) / 2

`11 2 6 1 5 4 8 7 1 4`