

```

import java.util.*;

public class Bully {
    int coordinator;
    int max_processes;
    boolean processes[];

    public Bully(int max) {
        max_processes = max;
        processes = new boolean[max_processes];
        coordinator = max;

        System.out.println("Creating processes..");
        for(int i = 0; i < max; i++) {
            processes[i] = true;
            System.out.println("P"+ (i+1) + " created");
        }
        System.out.println("Process P" + coordinator + " is the coordinator");
    }

    void displayProcesses() {
        for(int i = 0; i < max_processes; i++) {
            if(processes[i]) {
                System.out.println("P" + (i+1) + " is up");
            } else {
                System.out.println("P" + (i+1) + " is down");
            }
        }
        System.out.println("Process P" + coordinator + " is the coordinator");
    }

    void upProcess(int process_id) {
        if(!processes[process_id - 1]) {
            processes[process_id - 1] = true;
            System.out.println("Process " + process_id + " is now up.");
        } else {
            System.out.println("Process " + process_id + " is already up.");
        }
    }

    void downProcess(int process_id) {
        if(!processes[process_id - 1]) {
            System.out.println("Process " + process_id + " is already down.");
        } else {
            processes[process_id - 1] = false;
            System.out.println("Process " + process_id + " is down.");
        }
    }

    void runElection(int process_id) {
        coordinator = process_id;
        boolean keepGoing = true;

        for(int i = process_id; i < max_processes && keepGoing; i++) {
            System.out.println("Election message sent from process " + process_id + " to process " + (i+1));

            if(processes[i]) {
                keepGoing = false;
                runElection(i + 1);
            }
        }
    }
}

```

```

}

public static void main(String args[]) {
    Bully bully = null;
    int max_processes = 0, process_id = 0;
    int choice = 0;
    Scanner sc = new Scanner(System.in);

    while(true) {
        System.out.println("Bully Algorithm");
        System.out.println("1. Create processes");
        System.out.println("2. Display processes");
        System.out.println("3. Up a process");
        System.out.println("4. Down a process");
        System.out.println("5. Run election algorithm");
        System.out.println("6. Exit Program");
        System.out.print("Enter your choice:- ");
        choice = sc.nextInt();

        switch(choice) {
            case 1:
                System.out.print("Enter the number of processes:- ");
                max_processes = sc.nextInt();
                bully = new Bully(max_processes);
                break;
            case 2:
                bully.displayProcesses();
                break;
            case 3:
                System.out.print("Enter the process number to up:- ");
                process_id = sc.nextInt();
                bully.upProcess(process_id);
                break;
            case 4:
                System.out.print("Enter the process number to down:- ");
                process_id = sc.nextInt();
                bully.downProcess(process_id);
                break;
            case 5:
                System.out.print("Enter the process number which will perform
election:- ");
                process_id = sc.nextInt();
                bully.runElection(process_id);
                bully.displayProcesses();
                break;
            case 6:
                System.exit(0);
                break;
            default:
                System.out.println("Error in choice. Please try again.");
                break;
        }
    }
}
}

```

```
shubhangi@DESKTOP-DDIBQ9R:~$ java Bully
```

```
Bully Algorithm
```

1. Create processes
2. Display processes
3. Up a process
4. Down a process
5. Run election algorithm
6. Exit Program

```
Enter your choice:- 1
```

```
Enter the number of processes:- 7
```

```
Creating processes..
```

```
P1 created
```

```
P2 created
```

```
P3 created
```

```
P4 created
```

```
P5 created
```

```
P6 created
```

```
P7 created
```

```
Process P7 is the coordinator
```

```
Bully Algorithm
```

1. Create processes
2. Display processes
3. Up a process
4. Down a process
5. Run election algorithm
6. Exit Program

```
Enter your choice:- 2
```

```
P1 is up
```

```
P2 is up
```

```
P3 is up
```

```
P4 is up
```

```
P5 is up
```

```
P6 is up
```

```
P7 is up
```

```
Process P7 is the coordinator
```

```
Bully Algorithm
```

1. Create processes
2. Display processes
3. Up a process
4. Down a process
5. Run election algorithm
6. Exit Program

```
Enter your choice:- 3
```

```
Enter the process number to up:- 5
```

```
Process 5 is already up.
```

```
Bully Algorithm
```

1. Create processes
2. Display processes
3. Up a process
4. Down a process

```
P6 is up
P7 is up
Process P7 is the coordinator
Bully Algorithm
1. Create processes
2. Display processes
3. Up a process
4. Down a process
5. Run election algorithm
6. Exit Program
Enter your choice:- 3
Enter the process number to up:- 5
Process 5 is already up.
Bully Algorithm
1. Create processes
2. Display processes
3. Up a process
4. Down a process
5. Run election algorithm
6. Exit Program
Enter your choice:- 4
Enter the process number to down:- 4
Process 4 is down.
Bully Algorithm
1. Create processes
2. Display processes
3. Up a process
4. Down a process
5. Run election algorithm
6. Exit Program
Enter your choice:- 5
Enter the process number which will perform election:- 2
Election message sent from process 2 to process 3
Election message sent from process 3 to process 4
Election message sent from process 3 to process 5
Election message sent from process 5 to process 6
Election message sent from process 6 to process 7
P1 is up
P2 is up
P3 is up
P4 is down
P5 is up
P6 is up
P7 is up
Process P7 is the coordinator
Bully Algorithm
1. Create processes
2. Display processes
3. Up a process
4. Down a process
```