

# PES UNIVERSITY RR CAMPUS GRAPH THEORY AND ITS APPLICATIONS UE20CS323 CASE STUDY: 1

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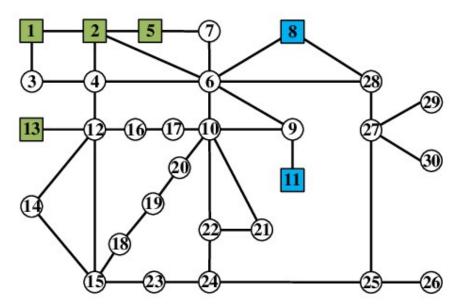
**TOPIC: GRAPH COLOURING USING** 

**GREEDY TECHNIQUE AND WELSH** 

**POWELL COMPARISON** 

(The 2 program files are attached in the zip file.)

### **GRAPH USED IS (WITH 30 nodes):-**



### **IN GREEDY TECHNIQUE:-**

```
Command Prompt
C:\Users\sutha\Documents\PESU\GTA\UNIT 2>a
Enter the number of vertices and edges :-
Enter edge in this format : " u\ v " where u and v are vertices and u is connected to v:-
0 1
0 2
2 3
1 4
4 6
1 5
1 3
3 5
6 5
5 7
5 27
7 27
27 26
26 28
26 29
26 24
24 25
5 8
8 9
9 5
9 16
16 15
15 11
11 3
11 12
11 13
11 14
13 14
14 17
17 18
```

```
Command Prompt
 Command Prompt
                                            The pattern of colouring is:-
14 17
17 18
                                            Vertex 0 ---> Color 0
18 19
                                           Vertex 1 ---> Color 1
19 9
                                           Vertex 2 ---> Color 1
14 22
                                           Vertex 3 ---> Color 0
                                           Vertex 4 ---> Color 0
22 23
                                           Vertex 5 ---> Color 2
9 21
                                           Vertex 6 ---> Color 1
21 20
9 20
                                           Vertex 7 ---> Color 0
21 23
                                           Vertex 8 ---> Color 0
23 24
                                           Vertex 9 ---> Color 1
8 10
                                           Vertex 10 ---> Color 1
                                           Vertex 11 ---> Color 1
The pattern of colouring is:-
Vertex 0 ---> Color 0
                                           Vertex 12 ---> Color 0
Vertex 1 ---> Color 1
                                           Vertex 13 ---> Color 0
Vertex 2 ---> Color 1
                                           Vertex 14 ---> Color 2
Vertex 3 ---> Color 0
                                           Vertex 15 ---> Color 0
Vertex 4 ---> Color 0
                                           Vertex 16 ---> Color 2
                                           Vertex 17 ---> Color 0
Vertex 5 ---> Color 2
Vertex 6 ---> Color 1
                                           Vertex 18 ---> Color 1
Vertex 7 ---> Color 0
                                           Vertex 19 ---> Color 0
Vertex 8 ---> Color 0
                                           Vertex 20 ---> Color 0
Vertex 9 ---> Color 1
                                           Vertex 21 ---> Color 2
Vertex 10 ---> Color 1
                                           Vertex 22 ---> Color 0
Vertex 11 ---> Color 1
                                           Vertex 23 ---> Color 1
Vertex 12 ---> Color 0
                                           Vertex 24 ---> Color 0
Vertex 13 ---> Color 0
                                           Vertex 25 ---> Color 1
Vertex 14 ---> Color 2
                                           Vertex 26 ---> Color 1
Vertex 15 ---> Color 0
                                           Vertex 27 ---> Color 3
Vertex 16 ---> Color 2
                                           Vertex 28 ---> Color 0
Vertex 17 ---> Color 0
                                           Vertex 29 ---> Color 0
Vertex 18 ---> Color 1
                                           Chromatic Number of the graph is 4
Vertex 19 ---> Color 0
                                           Time : 11400.000000 ns
Vertex 20 ---> Color 0
Vertex 21 ---> Color 2
                                           C:\Users\sutha\Documents\PESU\GTA\UNIT 2>
```

## **OBSERVATIONS IN GREEDY TECHNIQUE:-**

The time taken was **11.4 microseconds** in Greedy.

The Chromatic number of the graph was 4 in Greedy.

# **IN WELSH POWELL TECHNIQUE:-**

```
C:\Users\sutha\Documents\PESU\GTA\UNIT 2>gcc welsh_powell.c
C:\Users\sutha\Documents\PESU\GTA\UNIT 2>a
Enter the number of vertices and edges :-
Enter edge in this format : " u\ v " where u and v are vertices and u is connected to v:-
0 1
0 2
2 3
1 4
4 6
1 5
1 3
3 5
6 5
5 7
5 27
7 27
27 26
26 28
26 29
26 24
24 25
5 8
8 9
9 5
9 16
16 15
15 11
11 3
11 12
11 13
11 14
```

```
Command Prompt
                                       Command Prompt
                                      The pattern of colouring is:-
11 13
11 14
                                      Vertex 0 ---> Color 1
                                      Vertex 1 ---> Color 2
13 14
14 17
                                      Vertex 2 ---> Color 2
                                      Vertex 3 ---> Color 3
17 18
18 19
                                      Vertex 4 ---> Color 1
                                      Vertex 5 ---> Color 1
19 9
                                      Vertex 6 ---> Color 2
14 22
22 23
                                      Vertex 7 ---> Color 2
                                      Vertex 8 ---> Color 3
9 21
21 20
                                      Vertex 9 ---> Color 2
                                      Vertex 10 ---> Color 1
9 20
                                      Vertex 11 ---> Color 1
21 23
                                      Vertex 12 ---> Color 2
23 24
                                      Vertex 13 ---> Color 2
8 10
                                      Vertex 14 ---> Color 2
The pattern of colouring is:-
                                      Vertex 15 ---> Color 2
Vertex 0 ---> Color 1
                                      Vertex 16 ---> Color 1
Vertex 1 ---> Color 2
                                      Vertex 17 ---> Color 1
Vertex 2 ---> Color 2
                                      Vertex 18 ---> Color 2
Vertex 3 ---> Color 3
                                      Vertex 19 ---> Color 1
Vertex 4 ---> Color 1
                                      Vertex 20 ---> Color 1
Vertex 5 ---> Color 1
                                      Vertex 21 ---> Color 2
Vertex 6 ---> Color 2
                                      Vertex 22 ---> Color 1
Vertex 7 ---> Color 2
                                      Vertex 23 ---> Color 2
Vertex 8 ---> Color 3
                                      Vertex 24 ---> Color 1
Vertex 9 ---> Color 2
                                      Vertex 25 ---> Color 2
Vertex 10 ---> Color 1
                                      Vertex 26 ---> Color 2
Vertex 11 ---> Color 1
                                      Vertex 27 ---> Color 3
Vertex 12 ---> Color 2
                                      Vertex 28 ---> Color 2
Vertex 13 ---> Color 2
                                      Vertex 29 ---> Color 2
Vertex 14 ---> Color 2
                                      Chromatic Number of the graph is 3
Vertex 15 ---> Color 2
                                      Time: 4500.000000 ns
Vertex 16 ---> Color 1
Vertex 17 ---> Color 1
                                      C:\Users\sutha\Documents\PESU\GTA\UNIT 2>
Vertex 18 ---> Color 2
```

## **OBSERVATIONS IN WELSH POWELL TECHNIQUE:-**

The time taken was 4.5 microseconds in Welsh Powell.

The Chromatic number of the graph was 3 in Welsh Powell.

# **CONCLUSION:-**Therefore, Welsh Powell is little optimal in comparison to Greedy by taking less time and less chromatic number. **THANK YOU**