

## Task 2



BFS

[Dresden, Leipzig, Berlin, Magdeburg, Nuremberg]

1. Dresden
2. Leipzig Berlin
3. Berlin Magdeburg Nuremberg
4. Magdeburg Nuremberg Hamburg
5. Nuremberg Hamburg Hannover

DFS

[Dresden Leipzig Magdeburg Hannover Bremen]

1. Dresden

2. Leipzig Berlin

3. Magdeburg Nuremberg Berlin

4. Hannover Nuremberg Berlin

5. Bremen Hamburg Kassel Nuremberg Berlin

IDS

[Dresden]

level 1: Dresden

[Dresden Leipzig Berlin]

level 2: Dresden

Leipzig Berlin  
Berlin

[Dresden Leipzig Magdeburg Nuremberg Berlin]

level 3: Dresden

Leipzig Berlin

Magdeburg Nuremberg Berlin  
 Nuremberg Berlin  
 Berlin

## UCS

(0) (119) (204) (244) (382)  
 [Dresden, Leipzig, Berlin, Magdeburg, Nuremberg]

1. Dresden

0

2. Leipzig Berlin  
 119 204

3. Berlin Dresden Magdeburg Nuremberg  
 204 238 244 382

4. Dresden Magdeburg Magdeburg Nuremberg Dresden  
 238 244 370 382 408

Hamburg  
 495

5. Magdeburg Magdeburg Nuremberg Dresden Hamburg  
 244 370 382 408 495

6. Leipzig Magdeburg Nuremberg Hannover Dresden  
 369 370 382 392 408  
 Berlin 410 Hamburg 495

7.	Magdeburg	Nuremberg	Hannover	Dresden	Berlin
	370	380	392	408	410

Hamburg  
495

8.	Nuremberg	Hannover	Dresden	Berlin	Hamburg
	382	392	408	410	495

### Task 3

i : BFS      True

DFS      False

IDS      True

UCS      True

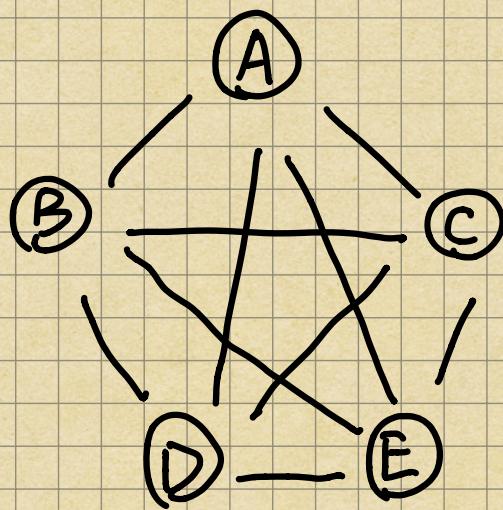
ii :

No . SNG is a undirected graph

iii :



IV:



V:

The worst case is everybody know each other so need  $10^6$  kB

for BFS. space =  $b^{d+1}$  in this problem

$$b = 10^6 - 1 \quad d = 0 \quad \text{so space } (10^6 - 1)^{0+1}$$

$$\text{so space} = 10^6 - 1 < 2^{30} \text{ kB}$$

## Task 4

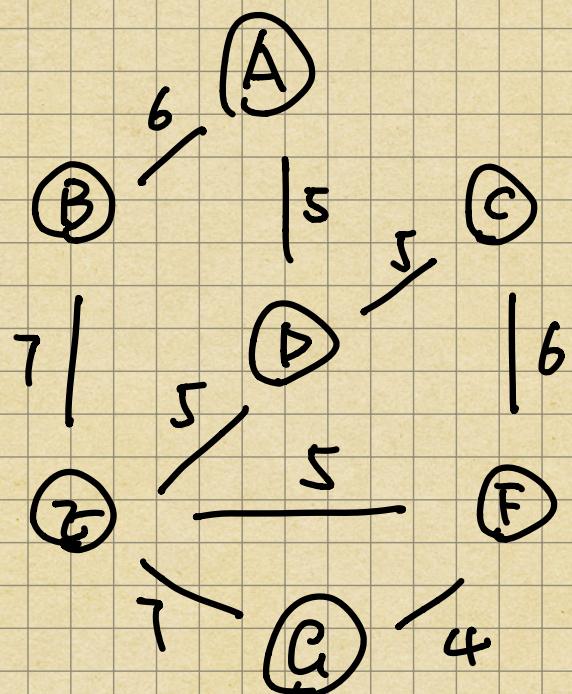
Best H:

$$h(A) = 17 \quad h(E) = 7$$

$$h(B) = 14 \quad h(F) = 4$$

$$h(C) = 10 \quad h(G) = 0$$

$$h(D) = 12$$



H 1: False

$$\begin{array}{ll} h(A) = 17 & h(E) = 5 \\ h(B) = 14 & h(F) = 4 \\ h(C) = 5 & h(G) = 0 \\ h(D) = 0 & \end{array}$$

H 2: False

$$\begin{array}{ll} h(A) = 17 & h(E) = 7 \\ h(B) = 14 & h(F) = 4 \\ h(C) = 10 & h(G) = 0 \\ h(D) = 12 & \end{array}$$

H 3: False

$$\begin{array}{ll} h(A) = 2 & h(E) = 2 \\ h(B) = 0 & h(F) = 0 \\ h(C) = 2 & h(G) = 0 \\ h(D) = 0 & \end{array}$$

H 4: True

H 5: True

Task 5

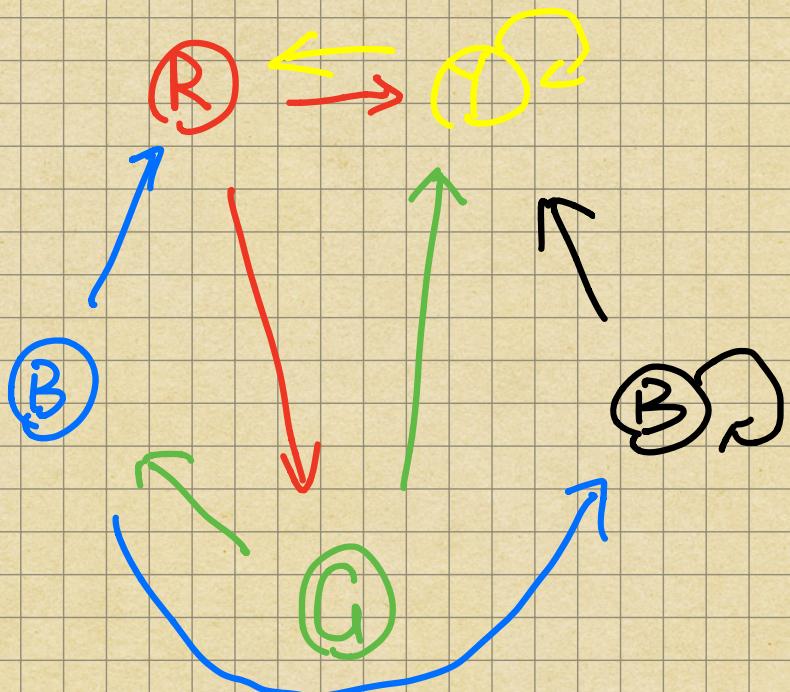
$$h(\text{Yellow}) = 4$$

$$h(\text{Red}) = 3$$

$$h(\text{Green}) = 2$$

$$h(\text{Blue}) = 1$$

$$h(\text{Black}) = 0$$



## Task 6

$$b = 4$$

$$d = 100$$

$$m = 208$$

BFS

$$\text{space} = b^{d+1} = 4^{100+1}$$

DFS

$$\text{space} = bm = 832$$

IDS

$$\text{space} = bd = 400$$

UCS

$$\text{space} = b^{\lceil \frac{d}{\epsilon} \rceil} = 4^{\lceil \frac{208}{\epsilon} \rceil}$$

(a) : Any methods cannot guarantee  
never need more than 100 kB

(b) : DFS and IDS can guarantee  
never need more than 1000 kB