CP312 Assignment #5

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Q1 BFS Algorithm

example: y(ø, 0) node (pred, Distance)

Queue

Step 1 y(ø, 0)

x(y, 1)

2. y(ø, 0)

u(y, 1)
x(y, 1)

3. y(ø, 0)

t(x, 2)
u(y, 1)
x(y, 1)

4. y(ø, 0)

w(x, 3)
t(x, 2)
u(y, 1)
x(y, 1)

5. y(ø, 0)

Step 6
- s(w, 3)
- w(x, 2)
- t(x, 2)
- u(y, 1)
- x(y, 1)
- y(ø, 0)

r(s, 4)
s(w, 3)
w(x, 2)
t(x, 2)
u(y, 1)
x(y, 1)

7. y(ø, 0)

v(r, 5)
r(s, 4)
s(w, 3)
w(x, 2)
t(x, 2)
u(y, 1)
x(y, 1)

8. y(ø, 0)

Done

Scanned with CamScanner

Path from y to v

DFS Algorithm

node(Pred, Discovery time, finish)

Q2

Step1 y(ø, 0, ø)

x(y, 1, ø)

2. y(ø, 0, ø)

t(x, 2, ø)

x(y, 1, ø)

3. y(ø, 0, ø)

w(t, 3, ø)

t(x, 2, ø)

x(y, 1, ø)

4. y(ø, 0, ø)

→ Hit node Already visited

w(t, 3, ø)

t(x, 2, ø)

x(y, 1, ~~ø~~ 4)

5. y(ø, 0, ø)

s(w, 5, ø)

w(t, 3, ø)

t(x, 2, ø)

x(y, 1, 4)

6. y(ø, 0, ø)

r(s, 6, ø)

s(w, 5, ø)

w(t, 3, ø)

t(x, 2, ø)

x(y, 1, 4)

7. y(ø, 0, ø)

v(r, 7, ø)

r(s, 6, ø)

s(w, 5, ø)

w(t, 3, ø)

t(x, 2, ø)

x(y, 1, 4)

8. y(ø, 0, ø)

v(r, 7, 8

r(s, 6, 9

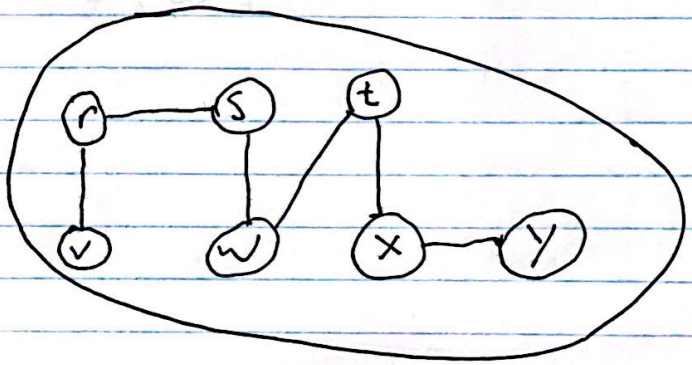
s(w, 5, 10

w(t, 3, 11

t(x, 2, 12

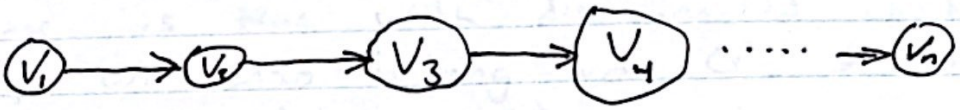
x(y, 1, 4)

9-15 y(ø, 0, ~~ø~~ 13)

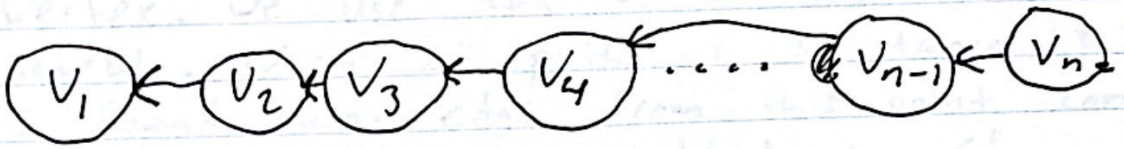


Scanned with CamScanner

Q5. assume For contridiction that all vertices $v \in V$ indegree $\neq \geq 1$.



if all vertices V_1 to V_n are connected by out degree there must be an edge connecting every vertex by in degree as well



However the only way to connect all points in these two ways creates a cycle for a finite graph. since a DAG must connect all vertices with out degree and connecting all points with in degree creates a cycle this contradicts the definition of a DAg.

As well Dag's must be topologically Searchable and without a starting point violate the definition of a Dag