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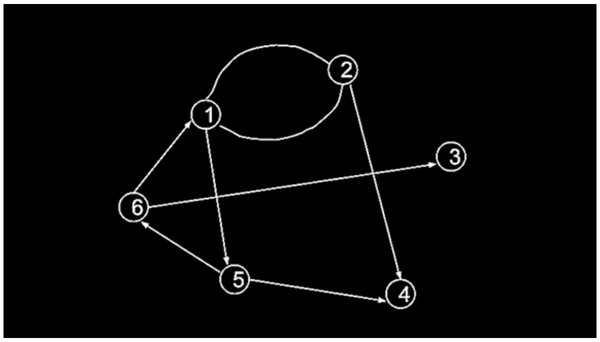
Course/Year/Section: CpE 2-1

Student Number: 202101628

ACTIVITY: GRAPHS



Graph 9:

$G_9 = (V_9, E_9)$

$V_9 = \{1, 2, 3, 4, 5, 6\}$

$E_9 = \{(1, 2), (1,5), (2,1)(2,4),$

$(5,4), (5,6), (6,3), (6,1)\}$

Outdegree of node:

1 is 2

2 is 2

3 is 0

4 is 0

5 is 2

6 is 2

Indegree of node:

1 is 2

2 is 1

3 is 1

4 is 2

5 is 1

6 is 1

Vertices adjacent to:

Node 1: v = {2,6}

Node 2: v = 1

Node 3: v = 6

Node 4: v = {2,5}

Node 5: v = 1

Node 6: v = 5

Vertices adjacent from:

Node 1: v = {2,5}

Node 2: v = {1,4}

Node 3: null

Node 4: null

Node 5: v = {4,6}

Node 6: v = {1,3}

Graph 9:

Edges incident to:

Node 1: E = {(1,2), (1,5), (2,1), (6,1)}

Node 2: E = {(2,1), (1,2), (2,4),}

Node 3: E = {(6, 3)}

Node 4: E = {(2,4), (5,4)}

Node 5: E = {(1,5), (5,6), (5,4)}

Node 6: E = {(6,1), (6,3), (5,6)}

Paths with:

Length of 2: v = {(1,2,4), (1,2,1), (1,5,6), (1,5,4), (2,1,2), (5,6,1), (5,6,3), (6,1,2), (6,1,5)}

Length of 3: v = {(1.5.6,1), (1.5.6,3), (2.1.5,6), (2,1,5,4), (6,1,5,6) (6,1,2,4), (5,6,1,2), (5,6,1,5), (6,1,5,4)}

Length of 4: v = {(2,1,5,6,3), (5.6.1.2.4)

Simple Paths with:

Length of 2: v = {(1,2,4), (1,5,6), (1,5,4), (5,6,1), (5,6,3), (6,1,2), (6,1,5)}

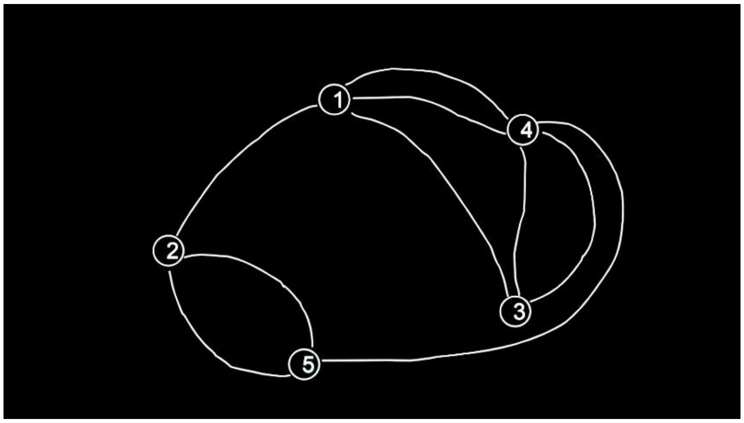
Length of 3: v = {(1,5,6,3), (2,1,5,4), (2.1.5,6) (5,6,1,2), (6,1,5,4), (6,1,2,4)

Length of 4: v = {(2,1,5,6,3), (5,6,1,2,4)}

Simple Cycle with:

Length of 2: v = {(1,2,1), (2,1,2)}

Length of 3: v = {(1,5,6,1), (5,6,1,5), (6,1,5,6)}



Graph 10

$G_{10} = (V_{10}, E_{10})$

$V_{10} = \{1, 2, 3, 4, 5, \}$

$E_{10} = \{(1,4), (2,1), (2,5)(3,1),$

$(3,4), (4,1), (4,3), (4,5)(5,2)\}$

Outdegree of node:

1 is 1

2 is 2

3 is 2

4 is 3

5 is 1

Indegree of node:

1 is 3

2 is 1

3 is 1

4 is 2

5 is 2

Vertices adjacent to:

Node 1: v = {2,3,4}

Node 2: v = 5

Node 3: v = 4

Node 4: v = {1,3}

Node 5: v = {2,4}

Vertices adjacent from:

Node 1: v = 4

Node 2: v = {1,5}

Node 3: v = {1,4}

Node 4: {1,3,5}

Node 5: v = 2

Graph 10:

Edges incident to:

Node 1: E = {(1,4), (2,1), (3,1), (4,1)}

Node 2: E = {(2,1), (2,5), (5,2),}

Node 3: E = {(4, 3), (3,4), (3,1)}

Node 4: E = {(2,4), (5,4)}

Node 5: E = {(4,1), (4,3), (4,5), (1,4), (3,4)}

Node 6: E = {(5,2), (2,5), (4,5)}

Paths with:

Length of 2: v = {(1,4,3), (1,4,1), (1,4,5), (2,1,4), (2,5,2), (3,1,4), (3,4,3), (3,4,1), (3,4,5), (4,1,4), (4,3,1), (4,3,4), (4,5,2), (5,2,5), (5,2,1)}

Length of 3: v = {(1.4.3,1), (1.4.5,2), (2.1.4,3), (2,1,4,5), (3.4,5,2) (3,1,4,3), (3,1,4,5), (4,3,1,4), (4,5,2,1), (5,2,1,4)}

Length of 4: v = {(1,4,5,2,1), (2,1,4,5,2), (8.1,4,5,2), (3,4,5,2,1), (4,5,2,1,4), (5,2,1,4,3), (5.2.1,4,5)}

Simple Paths with:

Length of 2: v = {(1,4,3), (1,4,5), (2,1,4), (3,1,4), (3,4,1), (3,4,5), (4,3,1), (4,5,2), (5,2,1)}

Length of 3: v = (1,4,5,2), (2,1,4,3), (2,1,4,5), (3,4,5,2), (3,1,4,5), (4,5,2,1), (5,2,1,4)}

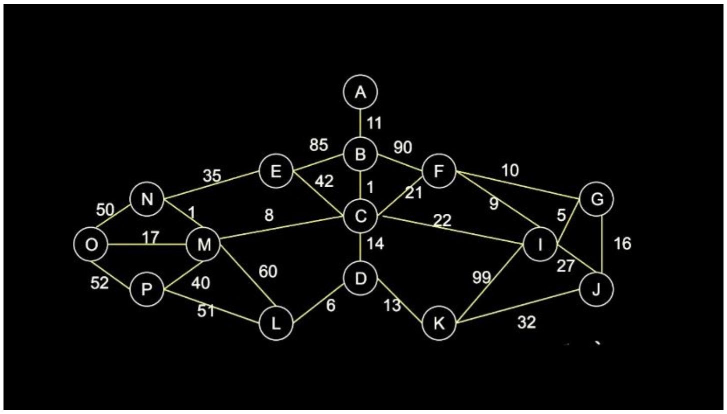
Length of 4: v = {(3,1,4,5,2), (3,4,5,2,1), (5,2,1,4,3)

Simple Cycle with:

Length of 2: v = {(1,4,1), (2.5,2), (3,4,3), (4,1,4), (4,3,4), (5,2,5)}

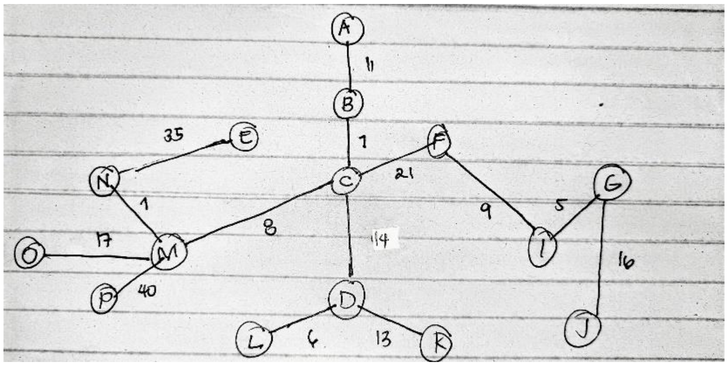
Length of 3: v = {(1,4,3,1), (3.1,4,3), (4,3,1,4)}

Length of 4: v = {(1,4,5,2,1), (2,1,4,5,2), (4,5,2,1,4), (5,2,1,4,5)}



Graph 29:

Minimum Spanning Tree of the graph using Kruskal's algorithm:



BC – 1

NM – 1

GI – 5

LD – 6

MC – 8

FI – 9

AB – 11

DK – 13

DC – 14

GJ – 16

MO – 17

CF – 21

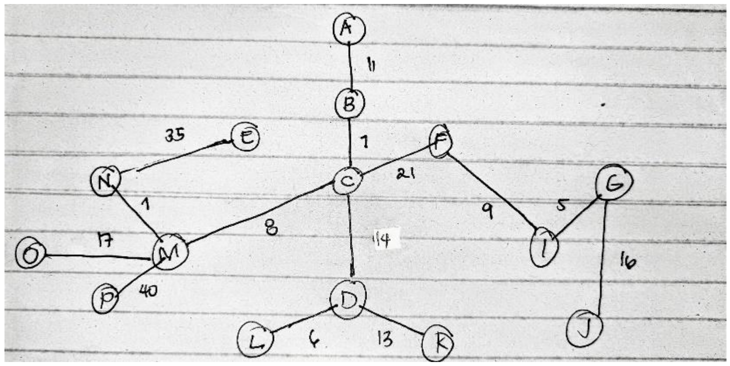
NE – 35

MP – 40

Cost of the minimum spanning tree:197

Minimum Spanning Tree of the graph using Prim's algorithm:

Arbitrary start is @ vertex A.



AB – 11

BC – 1

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NM – 1

CD – 14

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NE – 35

MP – 40

Cost of the minimum spanning tree: 197