Student Name: _____ _____ J#: _____

CSC 323 Algorithm Design and Analysis, Spring 2018
Instructor: Dr. Natarajan Meghanathan

Quiz 6 (Take Home) **Due: April 3rd: 1 PM** **Max. Points: 100**

Submission: Print this quiz, answer in the space provided and submit a hardcopy (either printed or handwritten-version in class at 1 PM). **Submissions after 1 PM will NOT be accepted.**

Q1 - 45 pts) Given the following items, their weights and values, compute the maximum value of the items that could be accumulated in a knapsack of weight W = 6 lb (also listed in the table). Compute your solutions as:

(i) Fractional Knapsack problem
(ii) Integer Knapsack problem (W = 6 lb)
(iii) Using the result of (ii), determine the total maximum value and the corresponding items that can be picked if the Knapsack weight is reduced to 5 lb.

Show all the work (including the value and history tables for the Integer Knapsack problem)

Leon Anderson

Item	Value($)	Weight (lb)
1	12	2
2	25	3
3	30	4
4	18	3
5	10	1

Ujjwal Baskota

Item	Value ($)	Weight (lb)
1	20	2
2	13	1
3	25	2
4	39	4
5	27	3

Albert Boateng

Item	Value ($)	Weight (lb)
1	45	3
2	62	4
3	18	1
4	35	2
5	20	1

Samuel Dagne

Item	Value($)	Weight (lb)
1	11	1
2	31	4
3	10	2
4	18	3
5	12	2

James Daniel

Item	Value ($)	Weight (lb)
1	41	3
2	28	2
3	46	4
4	24	2
5	13	1

Zakeia Davis

Item	Value ($)	Weight (lb)
1	19	1
2	80	4
3	25	2
4	45	3
5	15	1

Justin Epps

Item	Value($)	Weight (lb)
1	15	2
2	19	3
3	28	4
4	20	3
5	8	1

Amanuel Engeda

Item	Value ($)	Weight (lb)
1	10	2
2	12	3
3	19	4
4	8	1
5	14	2

Melrondarius Groom

Item	Value ($)	Weight (lb)
1	24	3
2	35	4
3	19	2
4	13	1
5	11	1

Yoseph Hailemariam

Item	Value($)	Weight (lb)
1	10	1
2	19	2
3	25	2
4	40	4
5	32	3

Antoine Hobson

Item	Value ($)	Weight (lb)
1	100	2
2	120	4
3	90	3
4	110	3
5	115	2

Portia Junius

Item	Value ($)	Weight (lb)
1	14	2
2	20	3
3	15	2
4	10	1
5	30	4

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Justin McGuffee

Item	Value($)	Weight (lb)
1	23	2
2	33	3
3	40	4
4	21	2
5	11	1

Ryun Moore

Item	Value ($)	Weight (lb)
1	17	2
2	24	3
3	33	4
4	11	1
5	30	3

Keara Rogers

Item	Value ($)	Weight (lb)
1	15	3
2	20	4
3	22	3
4	12	1
5	17	2

Timothy Stewart

Item	Value($)	Weight (lb)
1	32	4
2	23	3
3	30	4
4	11	2
5	7	1

Nebiyou Tadesse

Item	Value ($)	Weight (lb)
1	7	2
2	14	3
3	23	4
4	11	1
5	20	3

Phat Tran

Item	Value ($)	Weight (lb)
1	10	2
2	12	3
3	19	4
4	8	1
5	14	2

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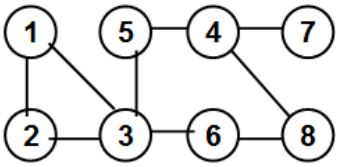
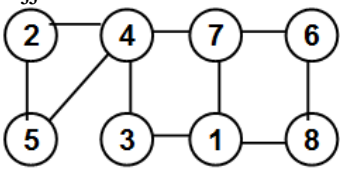
Q2 - 20 pts) Run a Breadth First Search (BFS) on the graph and find the level numbers of the vertices as well as identify the tree edges and cross edges.
Use the results to determine whether the graph is bipartite (2-colorable) or not. If the graph is bipartite, identify the two partitions of the graph. If the graph is not bipartite, identify the edges that prevent the graph from being bipartite.

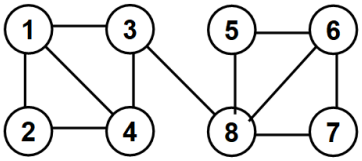
Leon Anderson



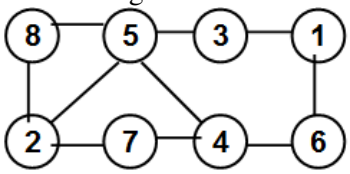
Ujjwal Baskota



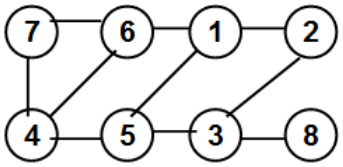
Albert Boateng



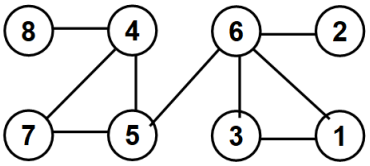
Samuel Dagne



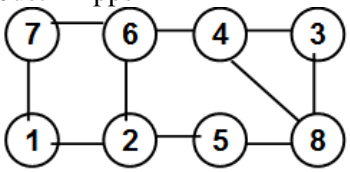
James Daniel



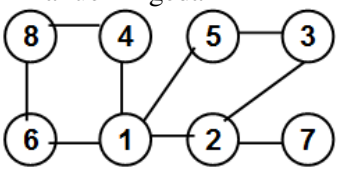
Zakeia Davis



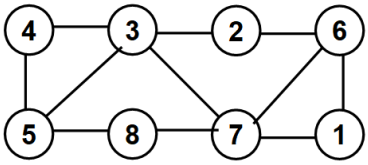
Justin Epps



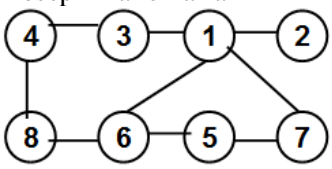
Amanuel Engeda



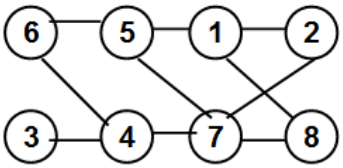
Melrondarius Groom



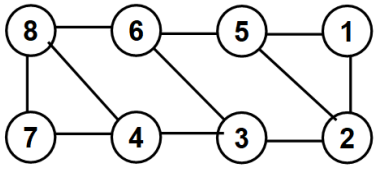
Yoseph Hailemariam



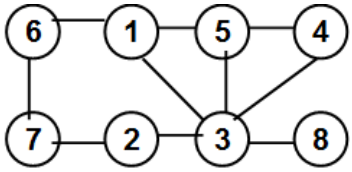
Antoine Hobson



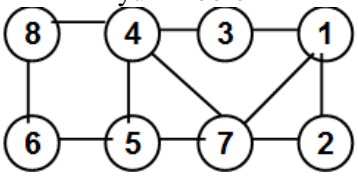
Portia Junius



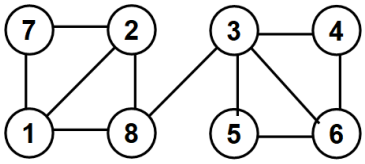
Justin McGuffee



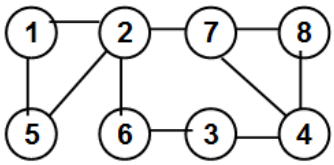
Ryun Moore



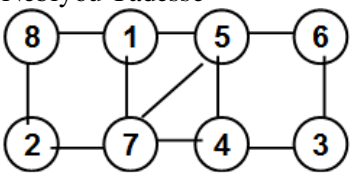
Keara Rogers



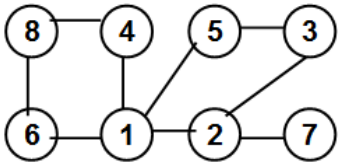
Timothy Stewart



Nebiyou Tadesse



Phat Tran



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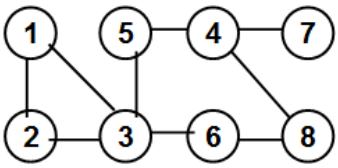
Q3 - 35 pts) Run a Depth First Search (DFS) on the graph. Write down the push and pop order for each of the vertices as well as identify the tree edges and cross edges.

Use the results to determine the articulation points and bridge edges of the graph, if any.

Also, transform the undirected graph to a directed graph such that all the vertices are in one strongly connected component.

Show all the work in detail.

Leon Anderson



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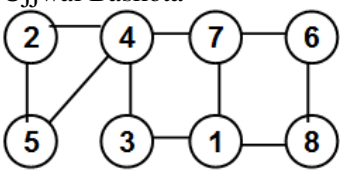

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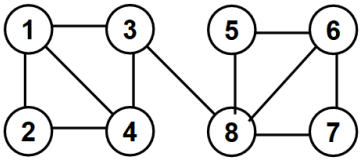

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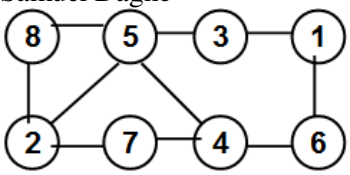

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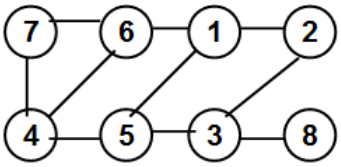

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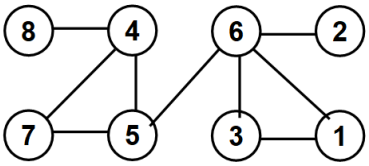

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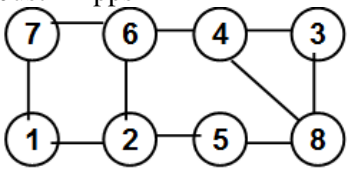
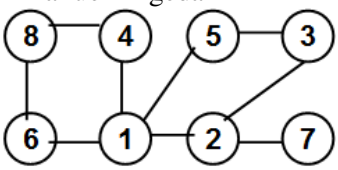


Amanuel Engeda



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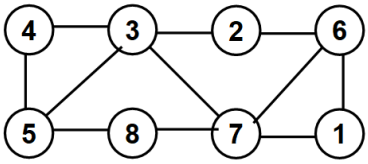

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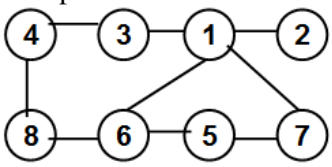

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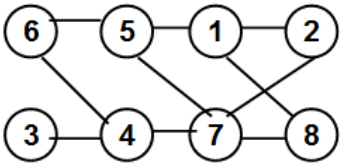

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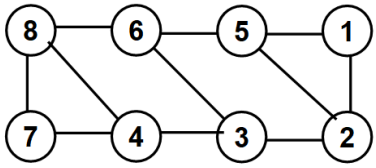

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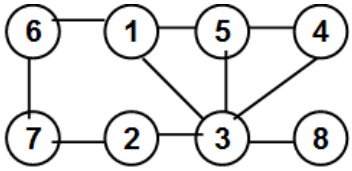

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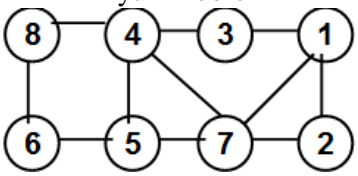
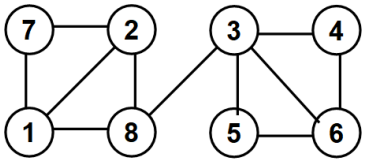
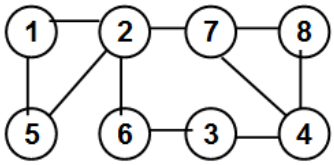


Keara Rogers



Timothy Stewart



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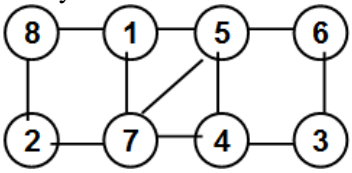

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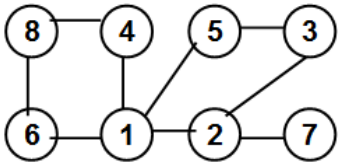

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