UAS in Discrete Math made by Michael Marchenko in July of 2018

Edited at 6am 26.7.2018.

s is your student number. k = s mod 10000. T = s mod 100. m = s mod 35. a = s mod 25.

L = s mod 10. . e = s mod 8. m7 = s mod 7. m6 = s mod 6. m5 = s mod 5. m4 = s mod 4.

m3 = s mod 3. m2 = s mod 2. u = s + 10000.

**Graph Theory and Trees Theory:**

1. How many edges are there in KT, K(a+1),(m+1)?

2. Find adjacency and incidence matrixes for the graphs:

m6 = 0: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/student16number16graph16.docx

m6 = 1: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/trees16graphs2solve16.docx

m6 = 2: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/student4number4graph.docx

m6 = 3: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/student3number3graph.docx

m6 = 4: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/trees24graphs2solve.docx

m6 = 5: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/trees4graphs2solve.docx

2.2. Find the number of faces for your graph.

2.3. Do graceful labeling of your graph.

http://azspcs.com/Contest/GracefulGraphs

3. Give Euler’s, Hamiltonian’s cycles, and paths in the graphs:

m4 = 0: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/student16number16graph16.docx

m4 = 1: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/trees16graphs2solve16.docx

m4 = 2: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/euler6cycle.ppt

m4 = 3: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/question2euler.ppt

4. Apply Dijkstra’s, Prim's and Kruskal’s algorithms to the graphs. Traverse the trees.

m6 = 0: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/student16number16graph16.docx

m6 = 1: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/trees16graphs2solve16.docx

m6 = 2: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/student4number4graph.docx

m6 = 3: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/student3number3graph.docx

m6 = 4: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/trees24graphs2solve.docx

m6 = 5: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/trees4graphs2solve.docx

5. Is the graph planar? Why?

m7 = 0: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/graph22jun16.docx

m7 = 1: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/graph7am22jun16.docx

m7 = 2: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/graph8am22jun16.docx

m7 = 3: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/graph1pm22june16.docx

m7 = 4: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/student16number16graph16.docx

m7 = 5: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/trees16graphs2solve16.docx

m7 = 6: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/planar4graphs.ppt

6. Solve the Graceful Graph Problem for *(e+3)* vertices.

http://azspcs.com/Contest/GracefulGraphs

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/code5better.txt

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/code6.txt

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/7code7.txt

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/8code.txt

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/9code.txt

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/10code10.txt

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/11code11.txt

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/12code12.txt

http://azspcs.com/Contest/GracefulGraphs

6.2. What is the number of faces for your graceful graph?

6.3. Is your graceful graph planar? Why?

7. Find the graceful labeling of

8. Color your graphs using as few colors as possible. Find the chromatic numbers of the graphs.

9. Color the map of the country number T using as few colors as possible.

http://www.worldometers.info/geography/alphabetical-list-of-countries/

10. Solve the trade graph.

Graph Indonesian international trade.

Weights are the percentages.

Optimize the trade.

USA 13

China 12

Japan 11

European Union 10

Singapore 9

India 8

Korea 7

Middle East 6

Malaysia 5

Thailand 4

Philippines 3

Australia 2

Russia 1

https://atlas.media.mit.edu/en/profile/country/idn/

Bad relations are between:

USA and China,

USA and Russia,

USA and Middle East,

Malaysia and Russia,

Australia and Russia.

Take e + 6 countries.

10.2. Do graceful labeling of your trade graph.

http://azspcs.com/Contest/GracefulGraphs

10.3. Is your trade graph planar? Why?

10.4. Find the number of regions in your trade graph.

11. Find the number of regions for the graph with L+20 edges and e+10 vertices.

11.2. Petersen graph:

m6 = 0: Does Petersen graph satisfy the condition e < 2v – 4?

m6 = 1: Does Petersen graph satisfy the condition e < 3v – 6?

m6 = 2: Is this graph planar?

m6 = 3: Why?

m6 = 4: Which important graph does Petersen graph similar to?

m6 = 5: Do graceful labeling of Petersen graph.

http://azspcs.com/Contest/GracefulGraphs

https://en.wikipedia.org/wiki/Petersen\_graph

https://en.wikipedia.org/wiki/Planar\_graph

12. Explain your project.

**Boolean algebra:**

13. Simplify the expression for your *e*.

e = 0: A´BC + BC + AB´ + ABC + AC´ + BC´

e = 1: AB´C + B´C + A´B´ + ABC´ + AC´ + BC´

e = 2: B´C + B´C + A´B´C´ + ABC´ + AB´C´ + BC´

e = 3: BC´ + B´C + A´B´C´ + ABC´ + AB´C´ + B´C´

e = 4: A´BC + BC + AB´ + ABC + AC´ + BC´ + A´B´C

e = 5: A´BC + AB´ + ABC + AC´ + BC´ + A´B´C

e = 6: BC + AB´ + ABC + AC´ + BC´ + A´B´C

e = 7: A´BC´ + BC + AB´ + AC´ + BC´ + A´B´C

Use Karnaugh Map.

https://en.wikipedia.org/wiki/Karnaugh\_map

14. Find the function for your truth table for your *e*.

e = 0: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/e0\_truth\_table.docx

e = 1: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/e1\_truth\_table.docx

e = 2: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/e2\_truth\_table.docx

e = 3: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/e3\_truth\_table.docx

e = 4: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/e4\_truth\_table.docx

e = 5: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/e5\_truth\_table.docx

e = 6: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/e6\_truth\_table.docx

e = 7: http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/e7\_truth\_table.docx