**CPT\_S 580 HW4**

**Yang Zhang**

**11529139 (graduate)**

**6.1.2**

Km,n is eulerian whenm != n and both m and n are bigger than 1. If one of m or n is one then Km,n is a star graph, if m = n, Km,n is a wheel graph. Neither wheel graph nor star graph is eulerian.

**6.1.3**

n-vertex wheel graph is not eulerian.

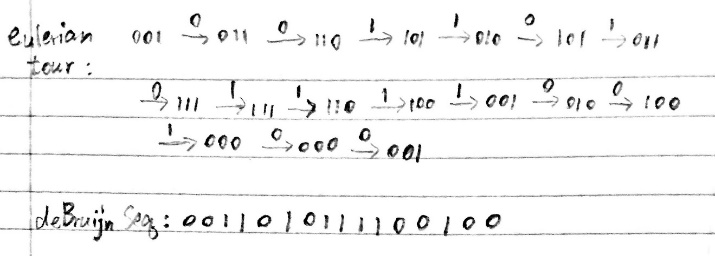
**6.1.20**

The graph is connected and its vertices all have even degrees, which guarantees that if visit a vertex by an edge in that graph there must be another edge can get out the vertex without repeating the same edge. Therefore, no matter what vertex to start with, any other vertex of the graph can be added to the existing eulerian tour by connecting the vertex a by the edge incident on it and then gets out from a and back to original eulerian tour by a different edge that also incident on a. We can repeat those steps until there is no unused edge that incident on a.

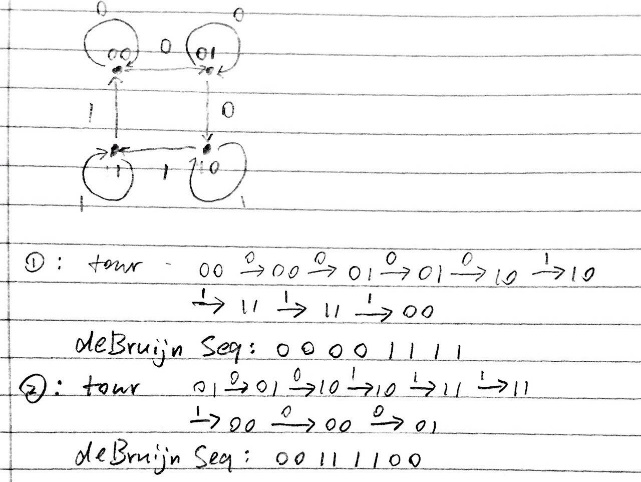
**6.1.21**

If there were no such edge, then the graph is not connected.

**6.2.1**

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**6.2.2**

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**6.3.1**

Kn is Hamiltonian

**6.3.2**

Km,n is Hamiltonian when m > 1 and n > 1

**6.3.3**

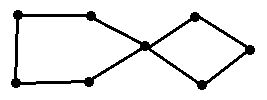
Any wheel graph is Hamiltonian

**6.3.4**

Tree is not Hamiltonian, because tree doesn’t contain cycle.

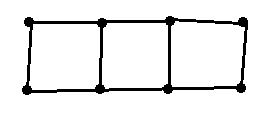
**6.3.7**

Eulerian but not Hamiltonian

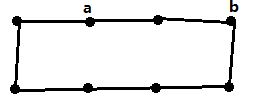


**6.3.8**

Hamiltonian but not Eulerian



**6.3.9**

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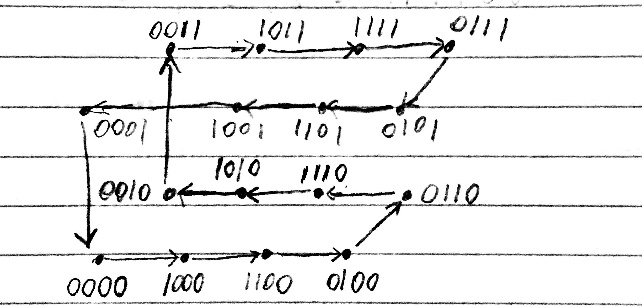
Vertices a and b are not adjacent.

deg(a) + deg(b) = 4, #vertices = 8

deg(a) + deg(b) < 8

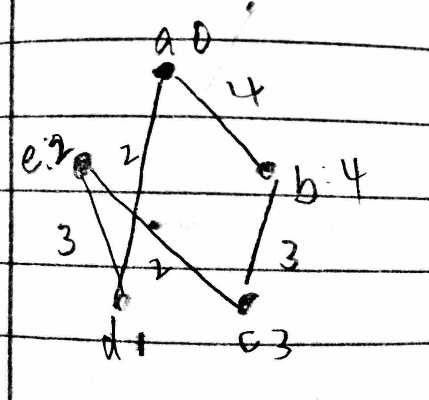
The graph is Hamiltonian but it does not satisfy ore’s theorem.

**6.4.1**

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**6.4.2**

**Nearest neighbor:**

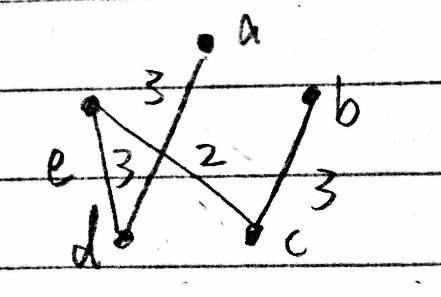


Visiting sequence: {a, d, e, c, b, a}

Total weight: 2 + 3 + 2 + 3 + 4 = 14

**Double the tree and tree matching have the same result:**

MST:

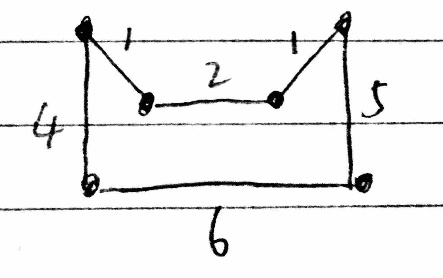


Visiting sequence: {a, d, e, c, b, a}

Total weight: 2 + 3 + 2 + 3 + 4 = 14

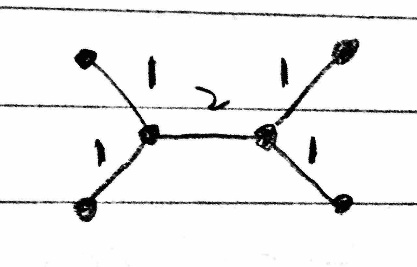
**6.5.1**

The minimum-length postman tour:



Total cost: 4 + 1 + 2 + 1 + 5 + 6 = 19

All minimum cost deadhead paths have the same pattern:



All those paths will travel each edge twice

The minimum cost = 2 \* (1 + 1 + 2 + 1 + 1) = 12

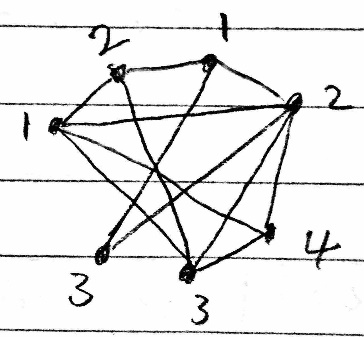
**6.5.14**

It is not Hamiltonian, because no Hamiltonian cycle can be found in the graph.

**9.1.2**

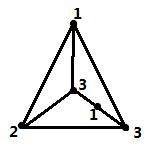
4 frequencies needed, because the graph has a 4 clique.

The frequency assignments:



**9.1.4**

The graph can be assigned with 3 different color, and since it has a 3 clique the vertex-coloring number cannot be smaller than 3. Therefore, 3 is the minimum vertex-coloring.



**9.1.8**