IS 609 Homework Week 7

Ben Arancibia

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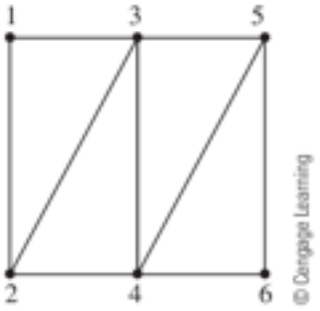
2) The bridges and land masses of a certain city can be modeled with graph G in Figure 8.7.



a. Is G Eulerian? Why or why not?

No Graph G is not Eulerian because there is not a pth between each pair of vertices and there are vertices with odd number of paths.

b. Suppose we relax the requirement of the walk so that the walker need not start and end at the same land mass but still must traverse every bridge exactly once. Is this type of walk possible in a city modeled by the graph in Figure 8.7? If so, how? If not, why not?

Yes it is possible for the walker to traverse each bridge once. They can do this by starting at point 5 and then going to the following points in this exact order: 3, 1, 2, 4, 6, 5, 4, 3, 2.

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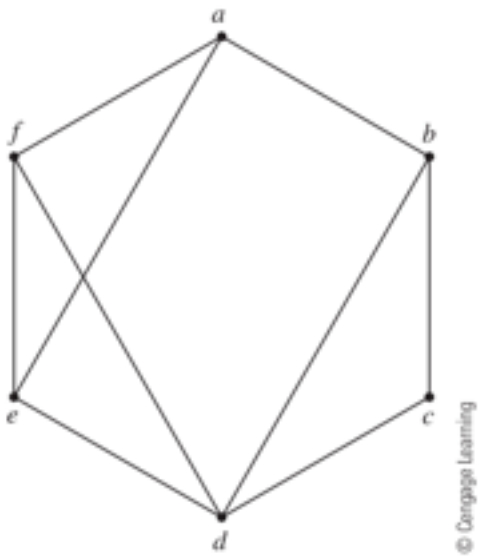
1) Consider the graph in Figure 8.11.



a. Write down the set of edges E(G).

{ab,ae,bc,bd,cd,de,df,ef,fa}

b. Which edges are incident with vertex b?

ab, bc, bd

c. Which vertices are adjacent to vertex c ?

Vertices b

d. Compute deg(a)

deg(a) = 3 because there are 3 edges

e. Compute |E(G|

There are 9 edges. Hexagon (6) + 3 extra edges.

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10) A basketball coach needs to finnd a starting lineup for her team. There are five positions that must be filled: point guard (1), shooting guard (2), swing (3), power forward (4), and center (5). Given the data in Table 8.7, create a graph model and use it to find a feasible starting lineup. What changes if the coach decides she can't play Hermione in position 3?

Table 8.7 Positions players can play

Alice	Bonnie	Courtney	Deb	Ellen	Fay	Gladys	Hermione
1, 2	1	1, 2	3, 4, 5	2	1	3, 4	2, 3

```
library(igraph)
```

```
## Warning: package 'igraph' was built under R version 3.1.3
```

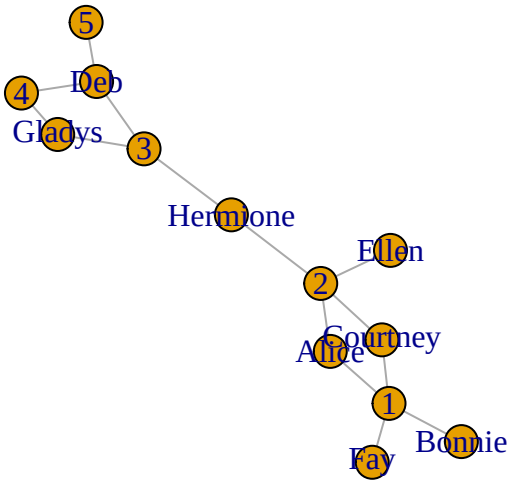
```
##
## Attaching package: 'igraph'
##
## The following objects are masked from 'package:stats':
##
##     decompose, spectrum
##
## The following object is masked from 'package:base':
##
##     union
```

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.1.3
```

```
positions <- c("Alice", 1, "Alice", 2, "Bonnie", 1, "Courtney", 1, "Courtney",
    2, "Deb", 3, "Deb", 4, "Deb", 5, "Ellen", 2, "Fay", 1, "Gladys", 3, "Gladys",
    4, "Hermione", 2, "Hermione", 3)

graph <- make_graph(positions, directed = FALSE)
plot(graph)
```



A possible starting lineup is:

Position	Player
1	Bonnie
2	Ellen
3	Hermoine
4	Gladys
5	Deb

If Hermione cannot play position 3 then there is not a feasible line up. This is because Gladys would have to move to position 3, but there would be no one to take her position 4 because Deb is already slated into position 5.