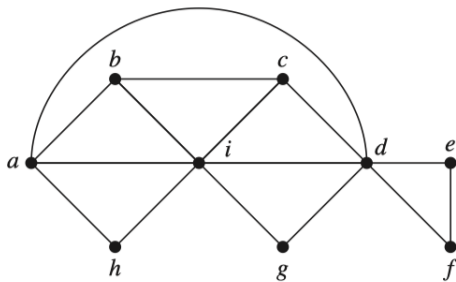


# Exercise Sheet 18

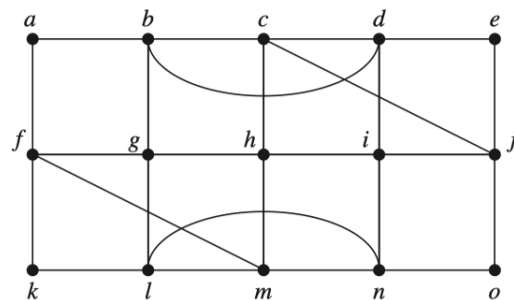
Discrete Mathematics, 2020.12.4

1. ([R], Page 770, Exercise 24 ) Use Huffman coding to encode these symbols with given frequencies: A: 0.10, B: 0.25, C: 0.05, D: 0.15, E: 0.30, F: 0.07, G: 0.08. What is the average number of bits required to encode a symbol? (Please also write down intermediate results after every “merge”.)
2. ([R], Page 770, Exercise 26(a)(b)(exclude variance))  
**a)**: Use Huffman coding to encode these symbols with frequencies a: 0.4, b: 0.2, c: 0.2, d: 0.1, e:0.1 in two different ways by breaking ties in the algorithm differently. First, among the trees of minimum weight select two trees with the largest number of vertices to combine at each stage of the algorithm. Second, among the trees of minimum weight select two trees with the smallest number of vertices at each stage. (Please also write down intermediate results after every “merge”.)  
**b)**:Compute the average number of bits required to encode a symbol with each code.
3. ([R], Page 704, Exercise 6, 8) In Exercises 6,8 determine whether the given graph has an Euler circuit. Construct such a circuit when one exists. If no Euler circuit exists, determine whether the graph has an Euler path and construct such a path if one exists.

6.

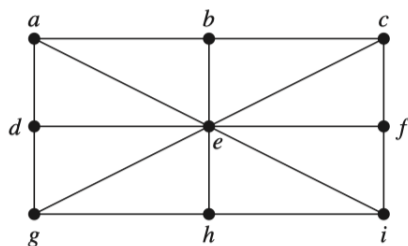


8.



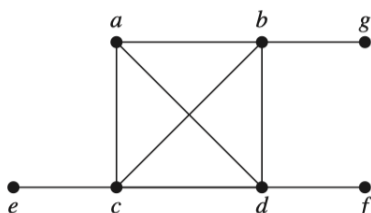
4. ([R], Page 705, Exercise 36) In Exercises 36 determine whether the given graph has a Hamilton circuit. If it does, find such a circuit. If it does not, give an argument to show why no such circuit exists.

36.



5. ([R], Page 705, Exercise 40) Does the graph in Exercise 33 have a Hamilton path? If so, find such a path. If it does not, give an argument to show why no such path exists.

33.



6. ([R], Page 706, Exercise 55) Show that a bipartite graph with an odd number of vertices does not have a Hamilton circuit.