Problem Solving Homework (Week 8)

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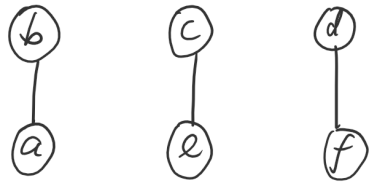
JH Chapter 4

4.3.2.3

(a) One subgraph can be as follows:



(b) G_n can be a matching with $2n$ vertexes, as is shown below

$$\begin{array}{ccc} a_1 & \text{——} & b_1 \\ a_2 & \text{——} & b_2 \\ \cdots & \text{——} & \cdots \\ a_n & \text{——} & b_n \end{array}$$

4.3.2.6

Algorithm 4.3.2.1 will always computes an optimal vertex cover for the infinite family of stars starting from $K2, n$, i.e., $K_n,\ n = 3, 4, \cdots$

4.3.2.9

(a)
```
TREE-MIN-VCP(r)
1  if r==NULL
2      return 0
3  if r→left==NULL and root→right==NULL
4      return 0
5  size_incl = 0
6  if r→left
7      size_incl=1+MIN-VCP(r→left→left)+MIN-VCP(r→left→right)
8  if r→right
9      size_excl=1+MIN-VCP(r→right→left)+MIN-VCP(r→right→right)
10 return min(size_incl, size_excl)
```

(b)
```
2-APPROX-MIN-VCP(G)
1  Let V' be a new empty set of vertexes
2  for each edge (u, v) ∈ G.E
3      if u ∉ V' and v ∉ V'
4          V' = V' ∪ {u, v}
5  return V'
```