

## Worksheet 11

1. Consider the sentence

*We are at home.*

Let  $\mathcal{G}$  be the graph whose vertices are the letters of the English language which appear somewhere in the sentence. In other words,  $v$  is a vertex of  $\mathcal{G}$  if there exists a word of the sentence “We are at home” which contains the letter  $v$ . Let the edges of  $\mathcal{G}$  be the pairs of letters which appear in the same word. That is,  $e$  is an edge of  $\mathcal{G}$  if there exists a word in the sentence “We are at home” which contains *both* the vertices (letters) of  $e$ .

Describe  $\mathcal{G}$  using the definition of graphs and find a model showing that  $\mathcal{G}$  is planar. Is  $\mathcal{G}$  connected? bipartite? contain  $\mathcal{K}_4$  as a subgraph? what is the degree sequence of  $\mathcal{G}$ ?