1) **What is the differences between a preference bias and a representation bias?**
   **[3 marks]**

A preference bias is when a learning algorithm incompletely searches a complete hypothesis space. It chooses which part of the hypothesis space to search. An example is decision trees. A representation bias completely searches and incomplete hypothesis space. It searches the whole space, but it is a small incomplete space. An example is a version space algorithm.

2) **If you had a bad representation bias, how would you fix it? Would this be easy?**
   **[3 marks]**

You would have to choose a whole new representation space and get all your data converted into this new space. It would be very hard.

3) **If you had a bad preference bias, how would you fix it? Would this be easy?**
   **[3 marks]**

You could just add new search control rules, like backtracking, look ahead search, or beam search. It would be fairly easy to add in these new search methods. You would just have to modify the learning algorithm. But the data would remain unchanged.

4) **What is the most common unbiased learner?**
   **[2 marks]**

A data base.

5) **How well would an unbiased learner classify unseen data?**
   **[2 marks]**

An unbiased learner couldn't classify unseen data. It could only classify data it had seen before, because it is only a database.

6) **What happens to the candidate elimination algorithm when there is noise (i.e., mistakes or errors) in the dataset?**
   **[2 marks]**

The version space collapses. The G-set and the S-set would pass each other. And the version space would be the empty set.