**RECORD YOUR DATA FROM THE FIRST STUDY IN TABLE 22-1**

| Run Number | Learning Rate | Total Sweeps | Converged? | SSE At End | Misses At End |
|---|---|---|---|---|---|
| 1 | 0.01 | | | | |
| 2 | 0.01 | | | | |
| 3 | 0.01 | | | | |
| 4 | 0.01 | | | | |
| 5 | 0.01 | | | | |
| 6 | 0.001 | | | | |
| 7 | 0.001 | | | | |
| 8 | 0.001 | | | | |
| 9 | 0.001 | | | | |
| 10 | 0.001 | | | | |

**Table 22-1. Record of results from the first simulation.**

**EXERCISE 22.1**

1. **From your observations of the network during training at the first learning rate, in a few sentences summarize the characteristics of the dynamics of learning this problem at these settings. For example, did learning proceed in a regular fashion, or did the network "plateau" at certain levels of hits and misses?**

2. **From your observations of the network during training at the second learning rate, in a few sentences summarize the characteristics of the dynamics of learning this problem at these settings.**

3. **In a sentence or two, and on the basis of the two sets of simulations that you have done, what would you say the effect of reducing the learning rate was on this problem for this architecture?**

RECORD YOUR DATA FOR THE SECOND STUDY IN TABLE 22-2

| Run Number | Learning Rate | Total Sweeps | Converged? | SSE At End | Misses At End |
|---|---|---|---|---|---|
| 1 | 0.01 | | | | |
| 2 | 0.01 | | | | |
| 3 | 0.01 | | | | |
| 4 | 0.01 | | | | |
| 5 | 0.01 | | | | |
| 6 | 0.001 | | | | |
| 7 | 0.001 | | | | |
| 8 | 0.001 | | | | |
| 9 | 0.001 | | | | |
| 10 | 0.001 | | | | |

Table 22-2.  Record of results from the second simulation.

EXERCISE 22.2

1. From your observations of the network during training at the first learning rate, in a few sentences summarize the characteristics of the dynamics of learning this problem at these settings.  For example, did learning proceed in a regular fashion, or did the network "plateau" at certain levels of hits and misses?

2. From your observations of the network during training at the second learning rate, in a few sentences summarize the characteristics of the dynamics of learning this problem at these settings.

3. In a sentence or two, and on the basis of the two sets of simulations that you have done, what would you say the effect of reducing the learning rate was on this problem for this architecture?  How does this compare to what you found with the 5-parity problem?

**Record Your Data For The Third Study In Table 22-2**

| Run Number | Learning Rate | Total Sweeps | Converged? | SSE At End | Misses At End |
|---|---|---|---|---|---|
| 1 | 0.1 | | | | |
| 2 | 0.1 | | | | |
| 3 | 0.1 | | | | |
| 4 | 0.1 | | | | |
| 5 | 0.1 | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

**Table 22-3. Record of results from the third simulation.**

**EXERCISE 22.3**

1. From your observations of the network during training at the first learning rate, in a few sentences summarize the characteristics of the dynamics of learning this problem at these settings. For example, did learning proceed in a regular fashion, or did the network "plateau" at certain levels of hits and misses?

2. From your observations of the network during training at the second learning rate, in a few sentences summarize the characteristics of the dynamics of learning this problem at these settings.

3. In a sentence or two, and on the basis of the two sets of simulations that you have done, what would you say the effect of reducing the learning rate was on this problem for this architecture?

4. In general, from your experience with these simulations, what can you say in a couple of sentences about how the two different architectures (value units and integration devices) deal with this particular problem?

5. *Bonus question: Choose a learning rate of 0.1, and repeat the above exercise using the 7-bit parity problem, integration devices, and 7 hidden units. How well does a network of integration devices fare with this larger version of the same kind of problem? How does this compare to the value unit architecture?*