Introduction to Biomedical Engineering
Lab observation I, 19 May 2009

Questions to be addressed

I. LabVIEW-based Experiment System

1. What are advantages and disadvantages of LabVIEW against conventional tools such as VC++ and MATLAB?

2. Briefly draw a schematic diagram of hardware connection to implement a simple path-finding micromouse.

3. Try to build, if available, a LabVIEW-based virtual oscilloscope including digital filters, and capture the screen of its front panel and block diagram.

4. Draw a schematic diagram of the system for electrical stimulation and recording.

5. Suggest a real-time block-averaging algorithm that you think is the most efficient in memory usage.

II. Local Field Potential (LFP) Recording in Brain Slices

1. Why is the concentric bipolar electrode useful in stimulating neural tissues while the Teflon-insulated wire is typically used in recording?

2. What will happen to recording signals if you use a recording electrode of much larger/smaller conducting area than typically-used electrodes? Explain why using the concept of equivalent measurement volume and impedance.

3. What are the useful condition of signal filtering for electrical neural recording?

4. Search and study neurological functions of the hippocampus, and briefly summarize them.

5. How is the neurophysiological mechanism underlying the population spike different from that of the excitatory postsynaptic potential (EPSP)?

6. Imagine a novel method by which you could detect neural activity in brain tissues.