Homework 4
Due: December 7 2011, before the end of the day

Consider the following C code:

```
for (i=1; i<=n; i++) {
    A[i] = A[i] + B[i]
    B[i] = x * B[i]
}
```

Use the techniques discussed during the lectures on vector processors to estimate performance of a vector processor throughout this exercise, assuming you have a 1-GHz version of VMIPS.

a. [16 points] Write the best VMIPS vector code for the inner portion of the loop. Assume x is in F0 and the addresses of A and B are in Ra and Rb, respectively.

b. [15 points] Find the total time for this loop on VMIPS for n=1000 (T_{1000}). What is the MFLOPS rating for the loop (R_{1000})?

c. [12 points] Find R_∞ for this loop.

d. [12 points] Find $N_{1/2}$ for this loop.

e. [15 points] Find N_v for this loop. Assume the scalar code has been pipeline scheduled so that each memory reference takes six cycles and each FP operation takes three cycles. Assume the scalar overhead is also T_{loop}.

f. [15 points] Assume VMIPS has two memory pipelines. Write vector code that takes advantage of the second memory pipeline. Show the layout in convoys.

g. [15 points] Compute T_{1000} and R_{1000} for VMIPS with two memory pipelines.