## Problem 2:

Assume that the 1<sup>st</sup> three lines of code for Microsoft Word are as follows – really!

| | | |
|---|---|---|
| Address 1: | 10000 | # static variable 10000 |
| Address 2: | 20000 | # static variable 20000 |
| Address 3: | Load R17 Address 1 | # Load 10000 into R17 |

Thus, we want to load the data at address 1 of the Microsoft Word assembly code into register #17.

Question A:
Using a modern superscalar machine's datapath as context (with two levels of on-chip cache), list all of the steps involved with loading this initial value stored in the program code written by Microsoft into physical register #17. You have just turned your machine on and are loading Microsoft Word for the first time.

TLB Miss, Page Table Lookup, TLB Update, L1 $ Miss, L2 $ Miss, Memory Reference, L2 Update, L1 Update, data into R17.

Question B:
Provide a rough estimate of the amount of time that this would take.

Seconds!