Exercises for week 9

1. Consider the processor design with address translation.

   (a) Optimize the design such that in translated mode only three cycles are needed for the execution of instructions which do not perform loads or stores. (10 points)

   (b) What happens in the correctness proof for (a) with the definitions of $t(i)$ and eev^i_{isa}? (10 points)

2. Specify the effect of:

   (a) jump to interrupt service routine, (10 points)

   (b) exception return. (10 points)

3. In user mode your program can only access memory locations which are physical addresses produced by the page tables of your user program.

   How could a program running in user mode get access to all memory locations if moves to the special purpose registers would be legal in user mode? (20 points)

4. (a) Define what is a heap isomorphism between C0-configurations. (10 points)

   (b) If two $c0$ configurations c and c' are both consistent to the same MIPS configuration d, then they are isomorphic. When we switch form assembly code to translated C-code we have to pick nondeterministically *one* such configuration. In what sense does it not matter, which one we pick? Which results justify this? (10 points)

5. (a) Implement function $writedisk(e_1, e_2)$. (10 points)

   (b) Show, that your implementations is correct. (10 points)