Bonus[1] exercises for week 11

This exercise serves *only* to remind you of definitions you have seen in the slides.

In what follows we always consider cvm configurations cvm, and C+A configurations (k, d), where k is a C0 configuration and d is a MIPS configuration including a swap memory component for the disk.

1. How are the general purpose registers of a virtual machine $cvm.vm(u).gpr(i)$ represented in (k, d):
   (a) if machine $vm(u)$ is running, (7 points)
   (b) if machine $vm(u)$ is suspended, (7 points)
   (c) what definition on what slide did you use? (6 points)

2. How are the special purpose registers $cvm.vm(u).spr(i)$ and the PC $cvm.vm(u).pc$ of a virtual machine represented in (k, d):
   (a) if machine $vm(u)$ is running, (7 points)
   (b) if machine $vm(u)$ is suspended, (7 points)
   (c) what definition on what slide did you use? (6 points)

   Keep in mind that not all special purpose registers are present in a virtual machine

3. Let $a = a.px \circ a.bx$ be a byte address.

   How is the memory $cvm.vm(u).m(a)$ of a virtual machine represented in (k, d):
   (a) if its page table entry is valid, (5 points)
   (b) if its page table entry is invalid, (5 points)
   (c) what definition on what slide did you use? (5 points)
   (d) Draw a memory map of the swap memory to illustrate, where user pages are stored on the disk. (5 points)

4. In a running machine we cannot always keep *eca* and *edata* of the virtual machine in the hardware registers. Why? (20 bonus points)

[1] We will try to grade for each student 6 out of 12 homework sheets and drop the worst result of the 6.

5. How are the abstract kernel configuration *cvm.c* and the C portion k of the concrete kernel related:

   (a) if the abstract kernel is running and not executing a special function, (3 points)

   (b) if the abstract kernel executes *runvm* and while the concrete kernel restores the registers of the user machine, (3 points)

   (c) if a user machine is running, (3 points)

   (d) while the concrete kernel reacts to $jisr$, (3 points)

   (e) What definitions on what slide are you using? (4 points)

   (f) Illustrate stack and program rest for cases (b) and (c). (4 points)