**What do you think will happen if your address-space size is bigger than your physical memory?**

Our textbook (Arpaci-Dusseau & Arpaci-Dusseau, 2012) already addressed this indirectly when discussing multi-level page tables. Their Figure 20.3: Linear (Left) And Multi-Level (Right) Page Tables (Chapter 20, p. 6) shows how multi-level page tables can ignore empty page tables by using a page table directory that indicates if a page table has data in it or not based on a valid bit. This is a summary of the reading that explains how this can happen: When paging sparse virtual address spaces, some of the pages frames will be unused. Rather than allocate memory to these unused pages, we can ignore them. The page frames are ones that have data in them, whereas the invalid ones (marked with a 0) have no data. The page directory will keep track of which page frames are “valid” and which aren’t. Memory will get allocated to page frames with a valid bit of 1 indicating that there is data in it. This idea can be extended even further for multiple levels of page directories, when for example you have an entire page directory that is empty/invalid, it too can be ignored to save room for valid page directories. So, segments of a sparse address space that are not being used can be ignored, instead of having memory allocated to them. By only allocating memory only when it is actually being used, physical memory can be smaller than a virtual address space--and it often is.

References

Arpaci-Dusseau, R. & Arpaci-Dusseau, A. (2012). *Operating Systems: Three Easy Pieces. Madison, WI: University of Wisconsin-Madison.* Retrieved from <http://pages.cs.wisc.edu/~remzi/OSTEP//>

**Discuss the weeks activities and your observations**

This week, I did my readings and freaked out a little bit because I was having trouble figuring out why the numbers were what they were, until I realized that 1KB = 1024B and wondered who the powerful and crafty person was who absconded with the metric system. :) Once I realized that the math was not “accurate” math, but an estimation, everything started lining up right again. I also went back to the video you posted the first week of class to look at masking again which was helpful. I did the quiz first, while everything was still fresh in my head. Then I looked at the programming assignment and knew I could do the “math”, but I needed to make it understandable for my graders. I hope that my tables help them understand what I did. I then worked on my discussion post. I know that there has been a lot of griping about the websites we use to find articles and I saw your post about peer-reviewed articles and agree. I don’t really feel comfortable using white pages, etc., but I do because it is what we were instructed to do. Some of the journal articles in those websites have horrible grammar/spelling and I suspect they are published in predatory journals and are not truly peer-reviewed. I have to use them, but I’ve also been trying to offset the required article with something more reputable to ease my conscience. I’ll take a .gov &.edu over a .com any day. :) As for your SME comments, this class is definitely boosting my confidence that I can become one someday even though it will be my second career -- Thank you!!