

## Linear Page Tables

### **What is a Linear Page Table?**

Linear page tables is a concept which relies on saving one entry per page. At minimum each entry contains a valid bit representing whether the entry has a corresponding frame. Each entry has a fixed size (depending e.g. on the OS) whether it's valid or not, so when trying to find a given entry  $n$  one can add  $n * \text{entrySize}$  to the base address.

The disadvantage for this is the large use of memory. A method trying to compensate for this, is leaving the invalid entries empty.

Valid	Page Frame
1	1
1	0
0	X
0	X
0	X
0	X
1	3
0	X

*a example of a linear page table starting at position 0, The numbers under the "valid" column are boolean values, and states if the page is in the page frame or not.*

### **How does a Linear Page Table work?**

The linear page table have an MMU (Memory Management Unit) that have a TLB in which it keeps track of recently used virtual-to-physical translations, it does this like the following: the MMU splits a virtual address into page number and page offset components. these page number is then used to make an index of the page table entries in an array. It then gets an actual physical address which is the concatenation of the page frame number in the page table entry and the page offset of the virtual address.

### **When to use a Linear Page Table:**

The linear Page table is used in older systems and systems that use micro processing. Linear page tables are efficient when repeatedly accessing the same page given that the MMU remembers the translation or when accessing a page within of a chunk of pages previously visited. When accessing a page located far away from previously accessed pages, we need two table lookups requiring extra time.