Virtual memory in pintOS

PintOS uses 80x86 architecture which does not provide access to memory through physical addresses, but PintOS has a work around for this problem by mapping kernel memory straight onto physical memory. Memory in pintos is split into frames called physical frames or page frames each page/physical frame is mapped onto its adjacent kernel virtual memory page e.g. the 1st page of the kernel virtual memory is mapped onto the first frame of the physical memory then the 2nd page of the kernel virtual memory is mapped onto the second frame of the physical memory so on and so forth. Using this method the frames can be accessed through the use of the kernel virtual memory.

Swapping uses virtual memory to swap the location of data from primary memory (RANDOM ACCESS MEMORY/ RAM) to secondary memory (memory that cannot be directly accessed by the CPU e.g. a small section of a HDD/SSD), e.g. saving files for long term. This increases the amount of available memory for a program or the operating system to use. Swapping occurs when a kernel tries to access a page that is stored in swap space (i.e. when is it not stored in the RAM) since it is not in ram and page fault will occur causing the page to be swapped from disk to RAM, this then causes the CPU to be able to access the data.

User virtual memory layout:

Diagram

Description automatically generated with low confidence