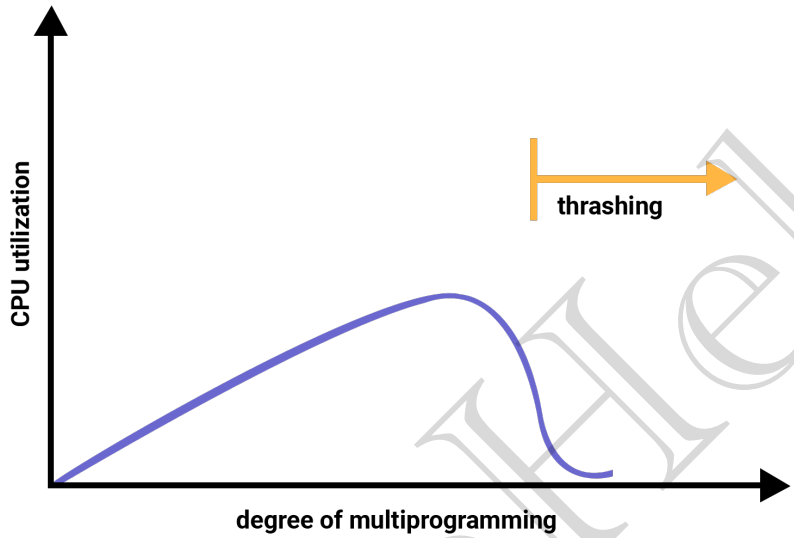
LEC-30: Thrashing

1. **Thrashing**
    a. If the process doesn't have the number of frames it needs to support pages in active use, it will quickly page-fault. At this point, it must replace some page. However, since all its pages are in active use, it must replace a page that will be needed again right away. Consequently, it quickly faults again, and again, and again, replacing pages that it must bring back in immediately.
    b. This **high paging activity is called Thrashing.**
    c. A system is Thrashing when it **spends more time servicing the page faults than executing processes.**



    d. **Technique to Handle Thrashing**
        i. **Working set model**
            1. This model is based on the concept of the **Locality** Model.
            2. The basic principle states that if we allocate enough frames to a process to accommodate its current locality, it will only fault whenever **it moves to some new locality.** But if the allocated frames are lesser than the size of the current locality, **the process is bound to thrash.**
        ii. **Page Fault frequency**
            1. **Thrashing** has a high page-fault rate.
            2. We want to **control** the page-fault rate.
            3. When it is too high, the process needs more frames. Conversely, if the page-fault rate is too low, then the process may have too many frames.
            4. We establish upper and lower bounds on the desired page fault rate.
            5. If pf-rate exceeds the upper limit, allocate the process another frame, if pf-rate fails falls below the lower limit, remove a frame from the process.
            6. By controlling pf-rate, thrashing can be prevented.