

# Activity 1:

## Hardware and System Calls

For the next Python program, answer the following questions. Assume the I/O is Synchronous and Blocking.

```
f=open(file.txt)
t=f.read()
f.close()
a=int(t)
a+=1
```

**1. Which devices would the operating system need to interact with?**

The OS would only have to interact with the Hard Disk Drive (HDD), as it's not asking for an input from the user's keyboard nor reading a file from a specific location.

**2. What would be loaded into memory in order to execute the program? How many variables?**

All of the (5) lines of the program –which is constituted by 3 variables (f, t, and a)– and the Python language interpreter.

**3. Assuming that file.txt is a small file (1 byte in size), would you recommend polling, interruptions or DMA? Why?**

As we're dealing with a small file, I would recommend the use of interruptions; there wouldn't be any extra delays like those caused by either the flags and state-changes or the waiting between polls (due to the assumption that the I/O is Synchronous and Blocking) caused by polling. DMA would probably work better for larger files, as it is capable of transferring large blocks of data at high speed between an external device and the main memory, without continuous intervention by the processor.

**4. How many interruptions would be generated by I/O, assuming open does not read from HDD?**

3 interruptions: One whenever there's a completed output (lines 1-3).

## References

- Dilse. (September 26th, 2018). Difference between Polling, DMA and Interrupt? *All About Circuits*. Recovered on September 1st, 2020 from <https://forum.allaboutcircuits.com/threads/difference-between-polling-dma-and-interrupt.152493/>
- Satishkumar, G. (November 30th, 2017). DMA Versus Polling or Interrupt Driven I/O. *Slideshare*. Recovered on September 1st, 2020 from <https://www.slideshare.net/sathishsak/dma-versus-polling-or-interrupt-driven-io>