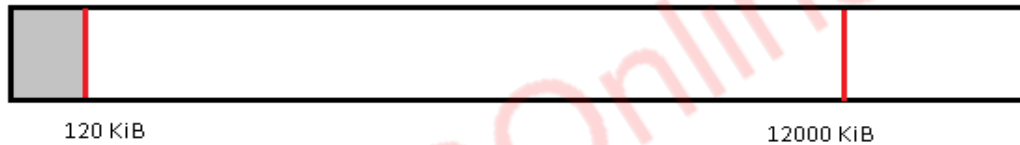


Q1.) Dave is using his Home Computer to stream an Action Film. The buffer size on his computer is **12 MiB**. Figure 1.a displays his buffer before he begins streaming.

(The grey portion represents data in the buffer)

Fig 1.a



(a) Describe the purpose of the two watermarks.

Dave's I.S.P offers him an incoming data rate of **5 Mbps** via a dedicated line. The film plays at a display rate of **800 Kbps**. He begins streaming at **8:45 pm**.

(b)(i.) What assumption can be made about the streaming process by the word "dedicated line"?

(b)(ii.) Calculate how long it takes for the buffer to fill up to the 12000 KiB mark.

Each time the buffer fills up to the 12000 KiB mark, Dave's media player halts the incoming transmission. Streaming is resumed when the buffer has emptied to the 120 KiB mark. The movie finishes at exactly **10:00 pm**.

(c.) Using the information above, calculate how many times the buffer fills and refills during this period.