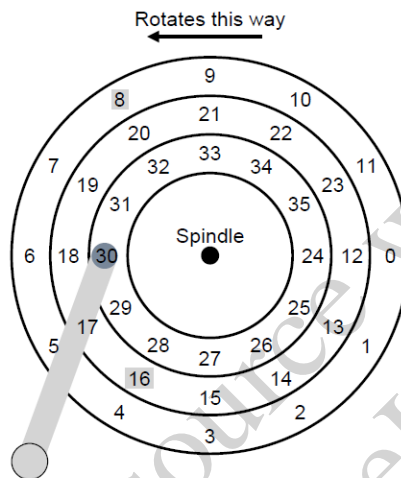


INF 551 – Spring 2016

Quiz 1: Storage systems (10 points)

10 minutes

Consider the following hard disk. Suppose the head is on sector #30 and the requests in the queue are 16 and 8 (which 16 arrived first). Suppose that the disk rotates at **6,000 RPM** and it takes **1ms** to travel a track. According to the SPTF (shortest positioning time first) algorithm, which request should be served first? Explain your answer by computing the positioning time for each request.



Answer:

The disk rotates at 6,000 RPM, so

$$T_{\text{rotation}} = \frac{\text{Time(ms)}}{1 \text{ rotation}} = \frac{1 \text{ min}}{6,000 \text{ rot}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{1000 \text{ msec}}{\text{sec}} = \frac{60,000 \text{ msec}}{6,000 \text{ rot}} = \frac{10 \text{ msec}}{\text{rotation}}$$

Consider 30->16: we will need to travel 1 track and rotate over 10 sectors. So

$$\text{The positioning time } T_{30-16} = T_{\text{seek}} + T_{\text{rotation}} = 1 \text{ ms} + \frac{10}{12} * 10 \text{ ms} \approx 9.33 \text{ ms}$$

Consider 30->8: we will need to travel 2 tracks and rotate over 2 sectors. So

$$\text{The positioning time } T_{30-8} = T_{\text{seek}} + T_{\text{rotation}} = 2 \text{ ms} + \frac{2}{12} * 10 \text{ ms} \approx 3.67 \text{ ms}$$

Therefore, sector 8 will be served first.