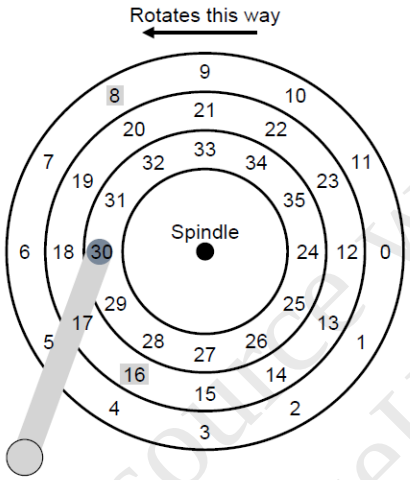
Name: _____ USC ID: _____

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

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

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

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

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

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

Therefore, sector 8 will be served first.