Homework 4

1.

a)

SSTF – This algorithm aims to pick the request closest to the current position on the disk as possible. This minimizes seek time and takes rotational delay into consideration.

SCAN - This algorithm moves in one direction and selects the request closest to the current position, then reverses direction when it reaches the end.

C-SCAN – This algorithm is the same as SCAN but when it reaches the end it doesn't reverse direction, instead it wraps back around to the beginning and continues in the same direction.

b)

hand drawn

2.

RAID-0:	C. Failure of one disk causes loss of data
RAID-1:	A. Wastes disk capacity
RAID-4:	D. Parity disk is performance bottleneck
RAID-5:	B. Complicated calculation of data and parity location

3.

hand drawn

4.

a)

The largest supported file is found by the following expression:
(12 × 8KB) + (2048 × 8KB) + (2048 × 2048 × 8KB) + (2048 × 2048 × 2048 × 8KB)

b)

Root Directory (1) – Reading content of root directory to find i-node of /a

I-Node (1) – Reading the i-node structure of file /a to access file's block pointers

Single Indirect Block (1) – Reading the access pointer to block 14

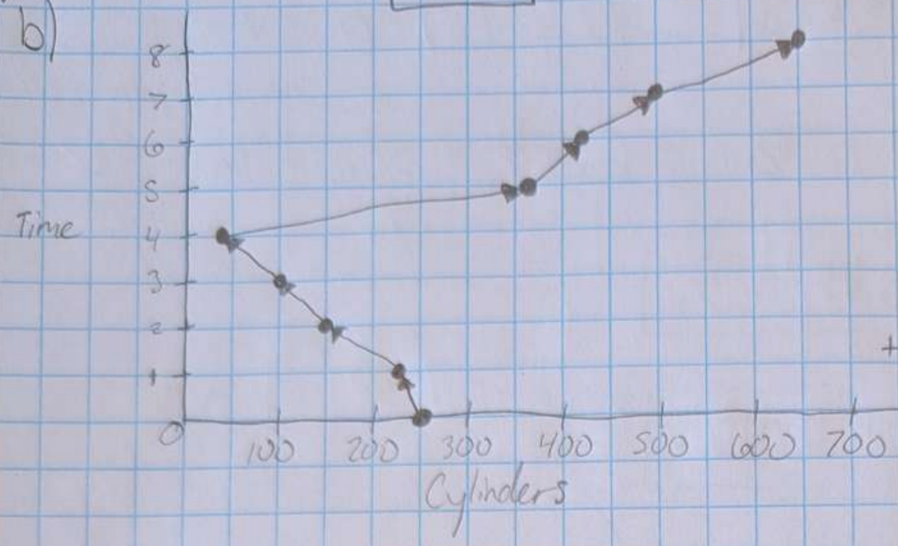
Block 14 (1) – Reading the content of block 14 of the file /a

= 4 disk reads

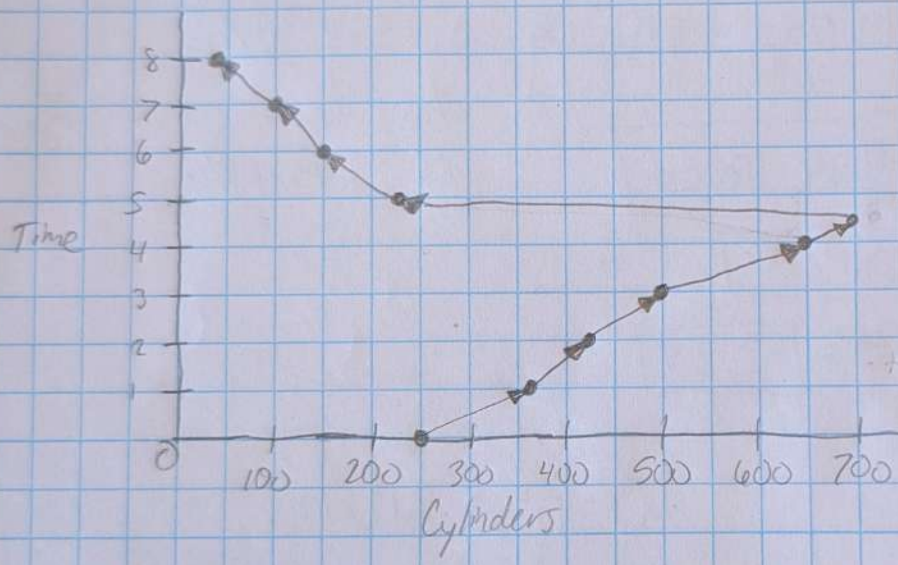
Homework 4

1) b)

$\boxed{\text{SSTF}}$

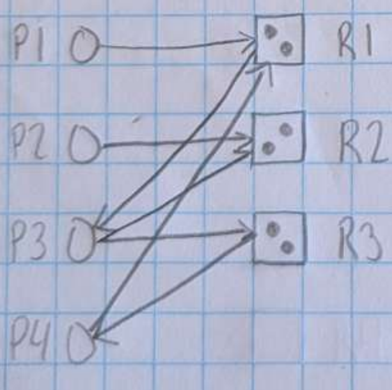


(250-230)	20
(230-150)	80
(150-100)	50
(100-40)	60
(360-40)	320
(420-360)	60
(500-420)	80
+ (650-500)	150
Total Movement:	820



(360-250)	110
(420-360)	60
(500-420)	80
(650-500)	150
(699-650)	49
(699-230)	469
(230-150)	80
(150-100)	50
(100-40)	60 +
Total Movement:	1,108

3)



P3 waiting for R2 and R3
R2 not available, P2 waiting
R3 held by P4
P4 waiting for R1
R1 held by P3

Cycle

P3 → R3 → P4 → R1 → P3

Deadlock