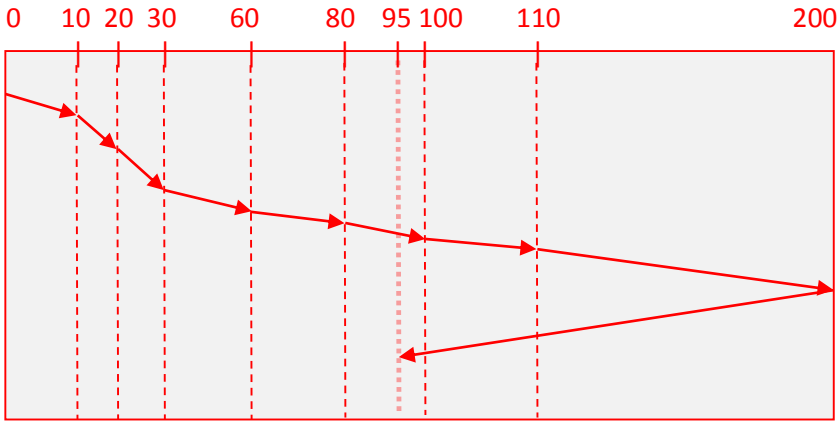
Operating Systems Final Exam (Spring 2016)

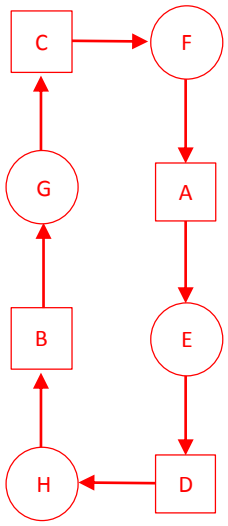
No :
Name: period: 60 min.

1. *(25P)* Let a static queue be "100, 80, 30, 20, 110, 10, 60", and the head pointer starts at 0. The head can move interval of [0 200]. When the head is moving to last demand, the system produces a new demand for "95". Find total head movement in cylinders by using SCAN disk scheduling algorithm graphically.



SCAN finds **305** cylinders head movements as total.

2. *(25P)* A, B, C, and D are resources. E, F, G, and H are processes. When E, F, G, H hold A, C, B, D respectively, then F, G, H, E request A, C, B, D, respectively. Draw graph model, and comment whether there is a deadlock or not.



Because of circular structure, there is a deadlock.

3. *(25P)* By using “least recently used”, how many page faults will occur at a memory of 4 frames when reference string is “4, 1, 3, 2, 4, 1, 3, 2, 1, 4, 3, 2”?

4	1	3	2	4	1	3	2	1	4	3	2
4	4	4	4	4	4	4	4	4	4	4	4
-	1	1	1	1	1	1	1	1	1	1	1
-	-	3	3	3	3	3	3	3	3	3	3
-	-	-	2	2	2	2	2	2	2	2	2
1	2	3	4	same	same	same	same	same	same	same	same

It finds 4 page faults.

4. *(25P)* Consider we have four processes and 10 free blocks in memory. Processes (A though D) need 5, 4, 4, and 7 blocks, respectively. At start, they all want to use only 2 resource. Then demand of processes are D-5 (D wants 5), C-2, A-1, D-2, A-2, B-2 respectively. Show how we can serve to processes by the Banker’s algorithm.

Start

	Has	Max
A	2	5
B	2	4
C	2	4
D	2	7

Free: 2

D-5

	Has	Max
A	2	5
B	2	4
C	2	4
D	2	7

Free: 2

Demand D-5 cannot be supported.

C-2

	Has	Max
A	2	5
B	2	4
C	4	4
D	2	7

Free: 0

	Has	Max
A	2	5
B	2	4
C	-	-
D	2	7

Free: 4

A-1

	Has	Max
A	3	5
B	2	4
C	-	-
D	2	7

Free: 3

D-2

	Has	Max
A	3	5
B	2	4
C	-	-
D	2	7

Free: 3

Demand D-2 cannot be supported.

A-2

	Has	Max
A	5	5
B	2	4
C	-	-
D	2	7

Free: 1

B-2

	Has	Max
A	-	-
B	2	4
C	-	-
D	2	7

Free: 6

	Has	Max
A	-	-
B	4	4
C	-	-
D	2	7

Free: 4

D-5

	Has	Max
A	-	-
B	-	-
C	-	-
D	2	7

Free: 8

	Has	Max
A	-	-
B	-	-
C	-	-
D	7	7

Free: 3

Now D-5 can be supported.