1. (10%) Convert each of the following base ten representations to its equivalent two's complement form using patterns of eight bits:

   (1) 6   (2) -6   (3) -17   (4) 13   (5) 0

2. (30%) Briefly explain the following terms:

   (1) Flip-flop

   (2) Floating-point notation

   (3) Program counter

   (4) Machine cycle

   (5) SIMD

   (6) Virtual memory

   (7) Bootstrap

   (8) Deadlock

   (9) URL

   (10) TCP/IP

3. (10%) Design an algorithm to find the square root of a positive number by starting with the number by starting with the number itself as the first guess and repeatedly producing a new guess from the previous one by averaging the previous guess with the result of dividing the original number by the previous guess.   What condition should terminate the repetition?

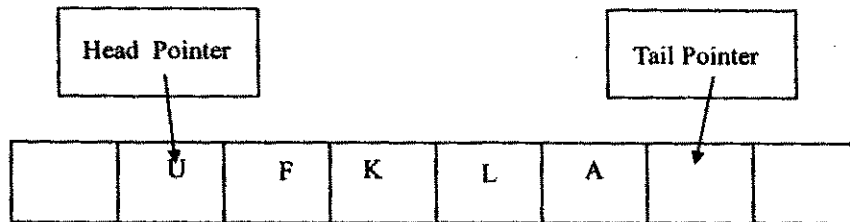4. (10%) What does the following program print?

```
#define N 6
main(){
    int i;
    int a[N];
    int *p, *q;
    p = &a[N-1];
    q = p - (N-1);
    for(i=0; i < N; i++) {
        *(p-i) = i;
        *(q+i) = i;
    }
    for(i=0; i<N; i++){
        printf("%d ", a[i]);
    }
    printf("\n");
}
```

5. (10%)

Suppose a queue implemented in a circular fashion is in the state shown in the figure

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below.   Draw a diagram showing the structure after the letters G and R are inserted, three letters are removed, and the letters D and P are inserted (5 points)

Head Pointer						Tail Pointer

	U	F	K	L	A		

6 (15%)

(a) What is a file allocation table?

(b) What advantages does an indexed file have over a hash file?

(c) What advantages does a hash file have over an indexed file?

7. Using commands such as SELECT, PROJECT, and JOIN, write sequences to answer the following questions about the information in the EMPLOYEE, JOB, and ASSIGNMENT relations in the Figure:

a). Obtain a list of the names and addresses of the company's employees. (7%)

b). Obtain a list of the names and addresses of those who have worked or are working in the personnel department. (8%).

EMPLOYEE relation

Empld	Name	Address	SSNum
25X15	Joe E. Baker	33 Nowhere St.	111223333
34Y70	Cheryl H. Clark	583 Downtown Ave.	999009999
23Y34	G. Jerry Smith	1555 Circle Dr.	111005555
.	.	.	.
.	.	.	.
.	.	.	.

JOB relation

Jobld	JobTitle	SkillCode	Dept
S25X	Secretary	T5	Personnel
S26Z	Secretary	T6	Accounting
F5	Floor manager	FM3	Sales
.	.	.	.
.	.	.	.
.	.	.	.

ASSIGNMENT relation

Empld	Jobld	StartDate	TermDate
23Y34	S25X	3-1-1996	4-30-1998
34Y70	F5	10-1-1998	.
23Y34	S25Z	5-1-1998	.
.	.	.	.
.	.	.	.
.	.	.	.

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