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Assignment 4

Header.h

```c
typedef struct data {

    char name[16];
    unsigned int age;

}data;

typedef struct Node{
    data d;
    struct Node * next;
}Node;
typedef struct queue{
    Node * head;
    Node * tail;
} queue;


void qinit(queue * q);
void  enq(queue * q, data d1);
data deq(queue * q);
int  qfull(queue * q);
int qempty(queue * q);
```

queue.c

```c
#include<stdio.h>
#include "queue.h"
#include<stdlib.h>


void qinit(queue * q){
    q->head = NULL;
    q->tail = NULL;
    return;
}

int  qfull(queue * q){
        Node *temp = (Node *)malloc(sizeof(Node));
    if (temp == NULL) {
```

```c
        return 1;
    } else {
        free(temp);
        return 0;
    }
}
int qempty(queue * q){
    if(q->head == NULL) return 1;

    return 0;
}

void  enq(queue * q, data d1){
    if(qfull(q)){
        printf("queue is full");
        return;
    }
    Node * newNode = (Node *)malloc(sizeof(Node));
    newNode->d =d1;
    newNode->next = NULL;
    if(q->head == NULL){
        q->head = newNode;
        q->tail = newNode;
    }else{
        newNode->next = q->head;
        q->tail->next = newNode;
        q->head = newNode;
    }
}
data deq(queue * q){
    data d;
    if(qempty(q)){
        printf("queue is full");
        return d;
    }
    Node* temp = q->head;
    d = temp->d;

    if (q->head == q->tail) {

        q->head = NULL;
        q->tail = NULL;
    } else {

        q->head = q->head->next;
        q->tail->next = q->head;
    }

    free(temp);
    return d;
}
```

Main.c

```c
#include <stdio.h>
#include "queue.h"

int main() {
    queue q;
    data d;

    qinit(&q);

    while (scanf("%s%u", d.name, &(d.age)) != -1) {
        if (!qfull(&q)) {
            enq(&q, d);
        }
    }
    while (!qempty(&q)) {
        d = deq(&q);
        printf("%s %u\n", d.name, d.age);
    }

    return 0;
}
```

Output

```
appleApple@Nisargs-Air Assigment4 % ./out
Enter the name and age (e.g., Alice 25). Type EOF (Ctrl+D) to stop:
nisarg 10
akshay 1
^D
Queue contents:
nisarg 10
akshay 1
appleApple@Nisargs-Air Assigment4 %
```