EUROPEAN UNIVERSITY OF LEFKE
Faculty of Engineering
Department of Software Engineering

COMP 217

DATA STRUCTURES

Lab Work No. 4

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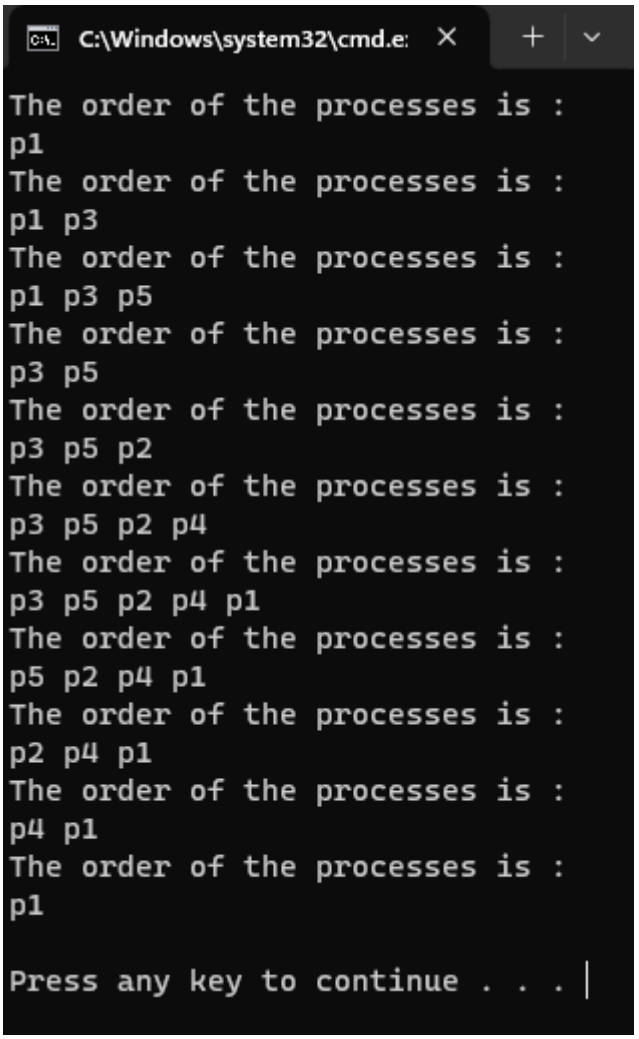
Code :

```c
#include <stdio.h>
#define SIZE 10
typedef struct {
    int items[SIZE];
    int rear, front;
} queue;
void initQ(queue * q){
    q->rear = -1;
    q->front = 0;
}
int isEmpty(queue *q) {
    return q->rear < q->front;
}
int isFull(queue *q) {
    return q->rear == SIZE - 1;
}
void insert2Q(queue *q,int x) {
    if(isFull(q)) {
        if(q->front != 0) {
            for(size_t i = 0; i <= (q->rear - q->front); i++) {
                q->items[i] = q->items[q->front+i];
            }
            q->rear -= q->front;
            q->front = 0;
            q->items[(++q->rear)]=x;
            return;
        }
        printf("Overload! The queue is full.\n");
        return;
    }
    q->items[(++q->rear)]=x;
}
int removeFromQ(queue *q) {
    if (isEmpty(q)){
        printf("Underflow! The queue is empty.\n");
        return '\0';
    }
    return q->items[(q->front++)];
```

```
}
void displayProcesses(queue q) {
    if(isEmpty(&q)) return;
    printf("The order of the processes is :\n");
    while(!isEmpty(&q))
    printf("p%d ",removeFromQ(&q));
    printf("\n");
}
int main(){
    queue q;
    initQ(&q);
    int process[]={1, 2, 3, 4, 5};
    insert2Q(&q,process[0]);
    displayProcesses(q);
    insert2Q(&q,process[2]);
    displayProcesses(q);
    insert2Q(&q,process[4]);
    displayProcesses(q);
    removeFromQ(&q);
    displayProcesses(q);
    insert2Q(&q,process[1]);
    displayProcesses(q);
    insert2Q(&q,process[3]);
    displayProcesses(q);
    insert2Q(&q,process[0]);
    displayProcesses(q);
    while(!isEmpty(&q)) {
        removeFromQ(&q);
        displayProcesses(q);
    }
    return 0;
}
```

Result :


C:\Windows\system32\cmd.e:
The order of the processes is :
p1
The order of the processes is :
p1 p3
The order of the processes is :
p1 p3 p5
The order of the processes is :
p3 p5
The order of the processes is :
p3 p5 p2
The order of the processes is :
p3 p5 p2 p4
The order of the processes is :
p3 p5 p2 p4 p1
The order of the processes is :
p5 p2 p4 p1
The order of the processes is :
p2 p4 p1
The order of the processes is :
p4 p1
The order of the processes is :
p1
Press any key to continue . . .