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/*
Title- Queue Implimentation using DMA
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Batch- TechnOrbit(PPA-8)
*/

#include<stdio.h>
#include<stdlib.h>

// ----- STRUCTURE DECLARATION -----

struct QUEUE
{
    int data;
    struct QUEUE* next;
};

// ----- FUNCTION TO CREATE NODE -----

struct QUEUE* CreateNode()
{
    struct QUEUE* newnode = NULL;
    newnode = (struct QUEUE*)malloc(sizeof(struct QUEUE));
    if(newnode == NULL)
    {
        printf("Queue is Full.....\n");
    }
    else
    {
        printf("Enter data in Queue: ");
        scanf("%d",&(newnode->data));
        newnode->next = NULL;
    }
    return newnode;
}

// ----- FUNCTION TO INSERT ELEMENT -----

void enqueue(struct QUEUE** insert,struct QUEUE** delete)
{
    struct QUEUE* newnode = NULL;
    newnode = CreateNode();
    if(*insert == NULL)
    {
        *insert = *delete = newnode;
    }
    else
    {
        (*delete) -> next = newnode;
        *delete = newnode;
    }
}

// ----- FUNCTION TO DELETE ELEMENT -----

void dequeue(struct QUEUE** insert,struct QUEUE** delete)
{
    struct QUEUE* tempnode = *insert;
    if((*insert)->next == NULL)
    {
        printf("Deleted element is: %d\n",(*insert)->data);
        free(*insert);
        *insert = *delete = NULL;
    }
    else

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    {
        *insert = (*insert) -> next;
        printf("Deleted element is: %d\n", tempnode->data);
        free(tempnode);
        tempnode = NULL;
    }
}

// ----- FUNCTION TO DISPLAY QUEUE -----

void display(struct QUEUE* start)
{
    while(start != NULL)
    {
        printf("%d <= ", start->data);
        start = start->next;
    }
}

// ----- FUNCTION TO CHECK QUEUE IS EMPTY OR NOT -----

int empty(struct QUEUE* insert)
{
    if(insert == NULL)
    {
        return 1;
    }
    return 0;
}

// ----- ENTRY POINT FUNCTION -----

void main()
{
    struct QUEUE *insert = NULL, *delete = NULL;
    int choice;
    do
    {
        printf("*****\n");
        printf("1.Enqueue\n2.Dequeue\n3.IsEmpty\n4.Display\n5.Exit\nEnter Your Choice: ");
        scanf("%d",&choice);
        switch(choice)
        {
            case 1: enqueue(&insert,&delete);
                    break;
            case 2: if(empty(insert))
                    {
                        printf("Queue Empty....\n");
                    }
                    else
                    {
                        dequeue(&insert,&delete);
                    }
                    break;
            case 3: if(empty(insert))
                    {
                        printf("Queue is Empty...\n");
                    }
                    else
                    {
                        printf("Queue is not Empty....\n");
                    }
                    break;
            case 4: if(empty(insert))
                    {
                        printf("Queue is Empty....\n");
                    }

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        }
        else
        {
            display(insert);
        }
        break;
    case 5: printf("Exiting.....\n");
            break;
    default: printf("Wrong Choice...! Please enter correct choice...\n");
            }
    }while(choice != 5);
}
```