Date:2023-06-10

S.No: 20 Exp. Name: Write a C program to implement different Operations on Queue using

Dynamic Array

Aim:

Write a program to implement queue using dynamic array.

In this queue implementation has

- 1. a pointer 'queue' to a dynamically allocated array (used to hold the contents of the queue)
- 2. an integer 'maxSize' that holds the size of this array (i.e the maximum number of data that can be held in this array)
- 3. an integer 'front' which stores the array index of the first element in the queue
- 4. an integer 'rear' which stores the array index of the last element in the queue.

```
Sample Input and Output:
        Enter the maximum size of the queue : 3
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 2
        Queue is underflow.
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 3
        Queue is empty.
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 1
        Enter element: 15
        Successfully inserted.
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 1
        Enter element : 16
        Successfully inserted.
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 1
        Enter element : 17
        Successfully inserted.
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 1
        Enter element : 18
        Queue is overflow.
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 3
        Elements in the queue : 15 16 17
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 2
        Deleted element = 15
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 2
        Deleted element = 16
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option: 3
        Elements in the queue : 17
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 2
        Deleted element = 17
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 3
        Queue is empty.
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 2
        Queue is underflow.
        1. Enqueue 2. Dequeue 3. Display 4. Exit
        Enter your option : 4
```

Source Code:

QUsingDynamicArray.c

#include<conio.h>
#include<stdio.h>
int*queue;

```
int front, rear;
int maxSize;
void intQueue()
   queue=(int *)malloc(maxSize * sizeof(int));
   front=-1;
   rear=-1;
}
void enqueue(int x)
   if(rear==maxSize-1)
   printf("Queue is overflow.\n");
}
else
{
   rear++;
   queue[rear]=x;
   printf("Successfully inserted.\n");
if(front==-1)
   front++;
}
}
void dequeue()
   if(front==-1)
      printf("Queue is underflow.\n");
   }
   else
   {
   printf("Deleted element = %d\n",*(queue+front));
   if(rear==front)
   {
      rear=front=-1;
   }
   else
   {
      front++;
      }
   }
}
void display()
   if(front==-1&&rear==-1)
      printf("Queue is empty.\n");
   }
   else
   {
      printf("Elements in the queue : ");
      for(int i=front;i<=rear;i++)</pre>
      {
         printf("%d ",*(queue+i));
```

```
printf("\n");
   }
}
int main()
   int op,x;
   printf("Enter the maximum size of the queue : ");
   scanf("%d",&maxSize);
   intQueue();
   while(1)
   {
      printf("1.Enqueue 2.Dequeue 3.Display 4.Exit\n");
      printf("Enter your option : ");
      scanf("%d",&op);
      switch(op)
      {
         case 1:
         printf("Enter element : ");
         scanf("%d",&x);
         enqueue(x);
         break;
         case 2:
         dequeue();
         break;
         case 3:
         display();
         break;
         case 4:
         exit(0);
      }
   }
}
```

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Queue is empty. 2 1.Enqueue 2.Dequeue 3.Display 4.Exit 2	Enter your option : 3
1.Enqueue 2.Dequeue 3.Display 4.Exit 2	Queue is empty. 2
	1.Enqueue 2.Dequeue 3.Display 4.Exit 2
	Enter your option : 2
	Queue is underflow. 4
	1.Enqueue 2.Dequeue 3.Display 4.Exit 4
	Enter your option : 4

Test Case - 2
User Output
Enter the maximum size of the queue : 2
1.Enqueue 2.Dequeue 3.Display 4.Exit 1
Enter your option : 1
Enter element : 34
Successfully inserted. 1
1.Enqueue 2.Dequeue 3.Display 4.Exit 1
Enter your option : 1
Enter element : 56
Successfully inserted. 1
1. Enqueue 2. Dequeue 3. Display 4. Exit 1
Enter your option : 1
Enter element : 45
Queue is overflow. 3
1.Enqueue 2.Dequeue 3.Display 4.Exit 3
Enter your option : 3
Elements in the queue : 34 56 2
1.Enqueue 2.Dequeue 3.Display 4.Exit 2
Enter your option : 2
Deleted element = 34 2
1.Enqueue 2.Dequeue 3.Display 4.Exit 2
Enter your option : 2
Deleted element = 56 2
1.Enqueue 2.Dequeue 3.Display 4.Exit 2
Enter your option : 2
Queue is underflow. 2
1.Enqueue 2.Dequeue 3.Display 4.Exit 2
Enter your option : 2
Queue is underflow. 3
1.Enqueue 2.Dequeue 3.Display 4.Exit 3
Enter your option : 3
Queue is empty. 1
1.Enqueue 2.Dequeue 3.Display 4.Exit 1
Enter your option : 1
Enter element : 56
Successfully inserted. 3
1.Enqueue 2.Dequeue 3.Display 4.Exit 3
Enter your option : 3
Elements in the queue : 56 4
1.Enqueue 2.Dequeue 3.Display 4.Exit 4
Enter your option : 4