Program:

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#include<stdio.h>
#define SIZE 5

int q[SIZE], front = -1, rear = -1, c, n;

void input_dq();
void output_dq();
void insertf();
void insertr();
void deletef();
void deleter();
void display();

int main() {
   do {
      printf("Menu:\n1.Input Restricted Deque\t2.Output Restricted Deque\t3.Exit\nEnter choice of
deque:");
      scanf("%d", &c);
      switch (c) {
         case 1:
            input_dq();
            break;
         case 2:
            output_dq();
            break;
         case 3:
            return 0;
         default:
            printf("Invalid Choice\n");
      }
   } while (c != 3);
   return 0;
}

void input_dq() {
   do {
      printf("Input Restricted Deque:\n1.Insert at rear\t2.Delete at front\t3.Delete at rear\t4.Display\
t5.Exit\nEnter operation:");
      scanf("%d", &c);
      switch (c) {
         case 1:
            insertr();
            break;
         case 2:
            deletef();
            break;
         case 3:
            deleter();
            break;
         case 4:
            display();
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            break;
        case 5:
            return;
        default:
            printf("Invalid operation\n");
    }
  } while (c != 5);
}

void output_dq() {
  do {
    printf("Output Restricted Deque:\n1.Insert at front\t2.Insert at rear\t3.Delete at rear\t4.Display\
t5.Exit\nEnter operation:");
    scanf("%d", &c);
    switch (c) {
        case 1:
            insertf();
            break;
        case 2:
            insertr();
            break;
        case 3:
            deleter();
            break;
        case 4:
            display();
            break;
        case 5:
            return;
        default:
            printf("Invalid operation\n");
    }
  } while (c != 5);
}

void insertr() {
  if ((front == 0 && rear == SIZE - 1) || (front == rear + 1)) {
    printf("Overflow\n");
  } else {
    printf("Enter number to insert:");
    scanf("%d", &n);
    if (front == -1) {
        front = 0;
        rear = 0;
    } else {
        if (rear == SIZE - 1) {
            rear = 0;
        } else {
            rear++;
        }
    }
    q[rear] = n;
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    }
}

void insertf() {
    if ((front == 0 && rear == SIZE - 1) || (front == rear + 1)) {
        printf("Overflow\n");
    } else {
        printf("Enter number to insert:");
        scanf("%d", &n);
        if (front == -1) {
            front = 0;
            rear = 0;
        } else {
            if (front == 0) {
                front = SIZE - 1;
            } else {
                front--;
            }
        }
        q[front] = n;
    }
}

void deleter() {
    if (rear == -1) {
        printf("Underflow\n");
    } else {
        printf("Deleted element is %d\n", q[rear]);
        if (rear == 0) {
            rear = SIZE - 1;
        } else {
            rear--;
        }
    }
}

void deletef() {
    if (front == -1) {
        printf("Underflow\n");
    } else {
        printf("Deleted element is %d\n", q[front]);
        if (front == SIZE - 1) {
            front = 0;
        } else {
            front++;
        }
    }
}

void display() {
    int i, j;
    i = front;
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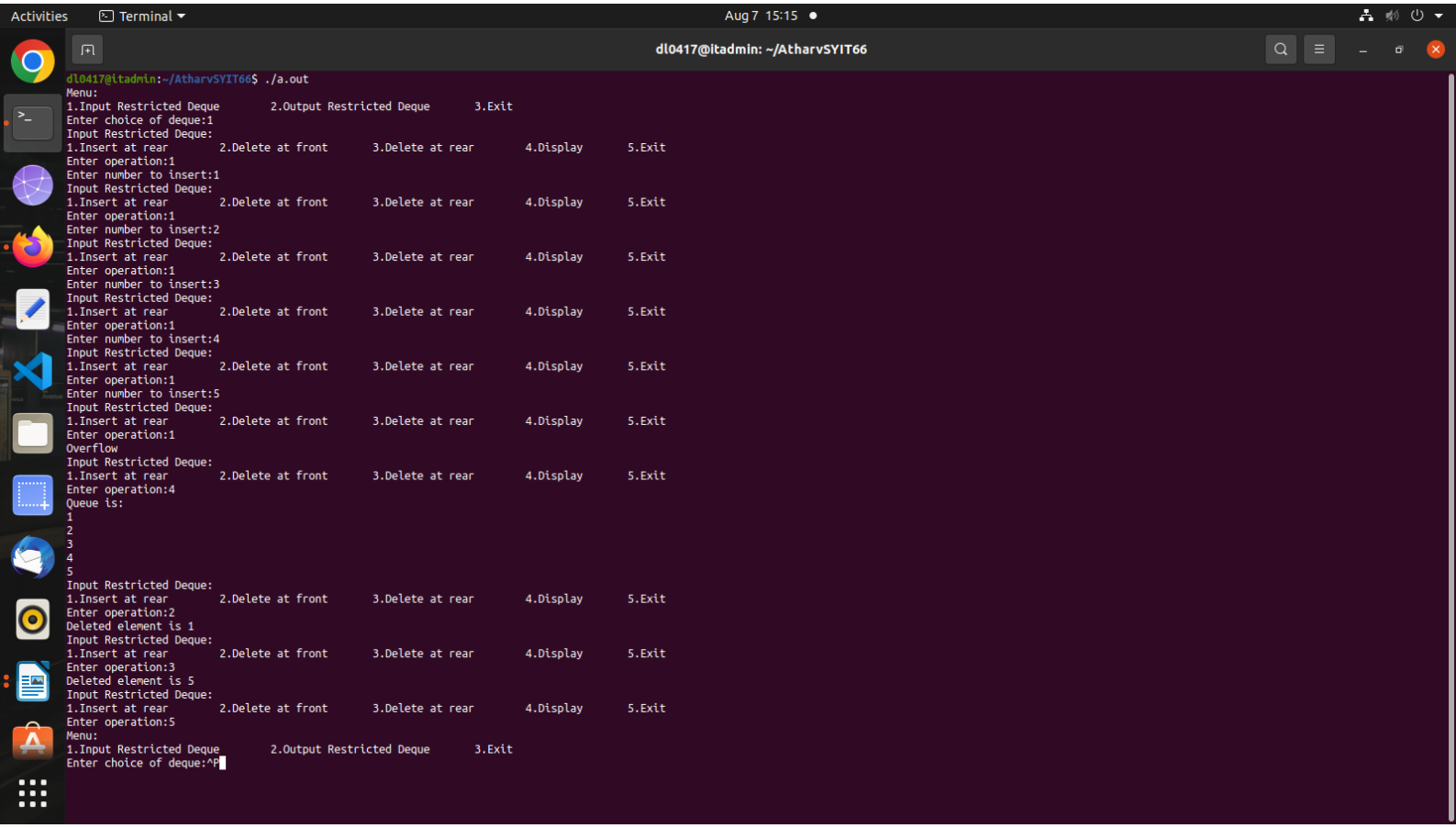
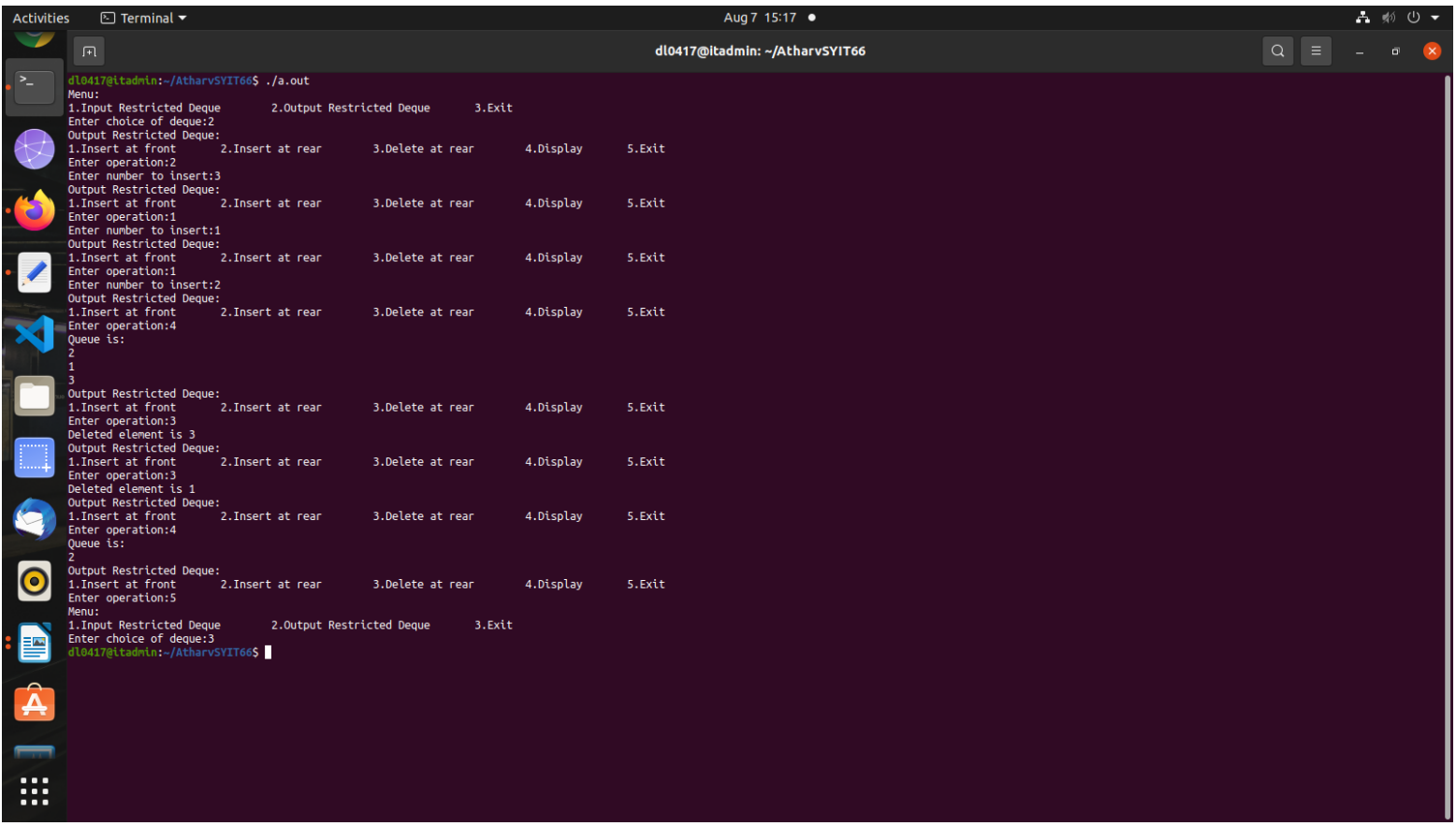
    j = rear;
    if (i == -1) {
        printf("Queue is Empty\n");
    } else {
        printf("Queue is:\n");
        if (i <= j) {
            while (i <= j) {
                printf("%d\n", q[i]);
                i++;
            }
        } else {
            while (i <= SIZE - 1) {
                printf("%d\n", q[i]);
                i++;
            }
            for (i = 0; i <= j; i++) {
                printf("%d\n", q[i]);
            }
        }
    }
}
```

Output:


Activities
Terminal
Aug 7 15:15
dl0417@itadmin: ~/AtharvSYIT66
dl0417@itadmin:~/AtharvSYIT66$ ./a.out
Menu:
1.Input Restricted Deque 2.Output Restricted Deque 3.Exit
Enter choice of deque:1
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:1
Enter number to insert:1
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:1
Enter number to insert:2
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:1
Enter number to insert:3
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:1
Enter number to insert:4
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:1
Enter number to insert:5
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:1
Overflow
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:4
Queue is:
1
2
3
4
5
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:2
Deleted element is 1
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:3
Deleted element is 5
Input Restricted Deque:
1.Insert at rear 2.Delete at front 3.Delete at rear 4.Display 5.Exit
Enter operation:5
Menu:
1.Input Restricted Deque 2.Output Restricted Deque 3.Exit
Enter choice of deque:^P


Activities
Terminal
Aug 7 15:17
dl0417@itadmin: ~/AtharvSYIT66
dl0417@itadmin:~/AtharvSYIT66$ ./a.out
Menu:
1.Input Restricted Deque 2.Output Restricted Deque 3.Exit
Enter choice of deque:2
Output Restricted Deque:
1.Insert at front 2.Insert at rear 3.Delete at rear 4.Display 5.Exit
Enter operation:2
Enter number to insert:3
Output Restricted Deque:
1.Insert at front 2.Insert at rear 3.Delete at rear 4.Display 5.Exit
Enter operation:1
Enter number to insert:1
Output Restricted Deque:
1.Insert at front 2.Insert at rear 3.Delete at rear 4.Display 5.Exit
Enter operation:1
Enter number to insert:2
Output Restricted Deque:
1.Insert at front 2.Insert at rear 3.Delete at rear 4.Display 5.Exit
Enter operation:4
Queue is:
2
1
3
Output Restricted Deque:
1.Insert at front 2.Insert at rear 3.Delete at rear 4.Display 5.Exit
Enter operation:3
Deleted element is 3
Output Restricted Deque:
1.Insert at front 2.Insert at rear 3.Delete at rear 4.Display 5.Exit
Enter operation:3
Deleted element is 1
Output Restricted Deque:
1.Insert at front 2.Insert at rear 3.Delete at rear 4.Display 5.Exit
Enter operation:4
Queue is:
2
Output Restricted Deque:
1.Insert at front 2.Insert at rear 3.Delete at rear 4.Display 5.Exit
Enter operation:5
Menu:
1.Input Restricted Deque 2.Output Restricted Deque 3.Exit
Enter choice of deque:3
dl0417@itadmin:~/AtharvSYIT66$