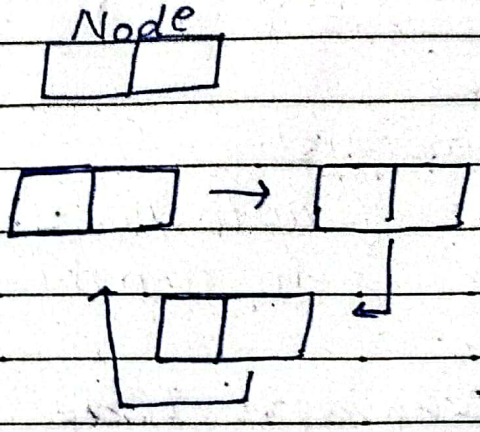
# Circular Linked List

Pseudo Codes

1) Adding Operations




a) At first

```
addfirst(Node):
    node.next=first
    last.next=node
    first=node
```

b) At last

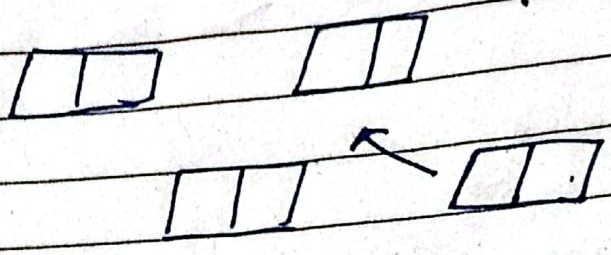
```
addlast(Node):
    node.next=first
    last.next=node

    last=node
```

```
    temp=first
    for i=1 to pos-1 do;
        temp=temp.next
    while(temp.next!=first)
        temp=.temp.next
    node.next=first
    temp.next=node
    last=node
```

Shubha

c) At specific position

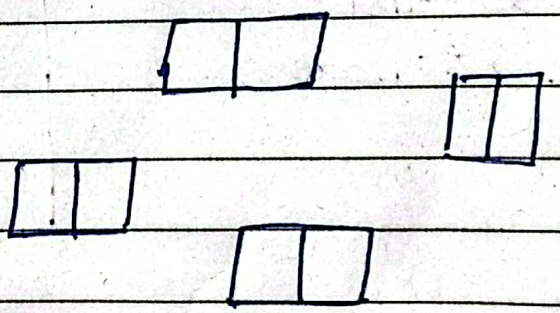


addrandom(Node)
pos
temp:first
for(i:1 upto pos-1)
    temp:temp.next

temp.next:=node
node.next:= temp.next
temp.next = node

2) Delete Operations

a) At first place



last.next = first.next
first=first.next

Shubha

b) At last place

~~node~~ temp: first
while (temp.next != last)
temp: temp.next

temp.next = first
last = temp

c) At specific position

temp = first
for(i=1 upto pos-1)
~~temp.next = temp.next.next~~
temp = temp.next
temp.next = temp.next.next

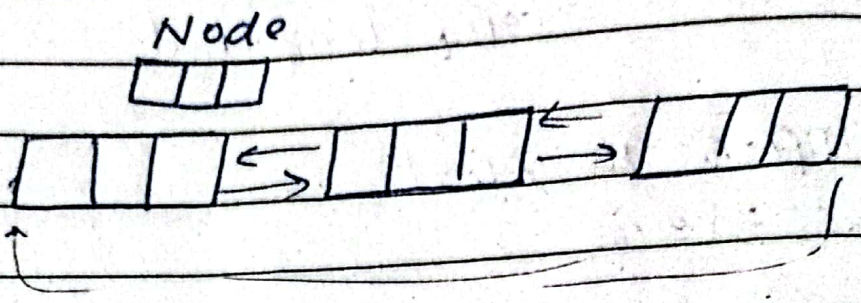
Shubha

Date
Page

# Doubly

## 1) Adding Operations

### a) At first




```
addfirst(Node)
node.prev = last
node.next = first
last.next = node
first.prev = node
first = node
```

### b) At last

```
addlast(Node)
node.next = first
node.prev = last
last.next = node
last.prev = node
last = node
```

first

Shubha

Date
Page

3) At specified

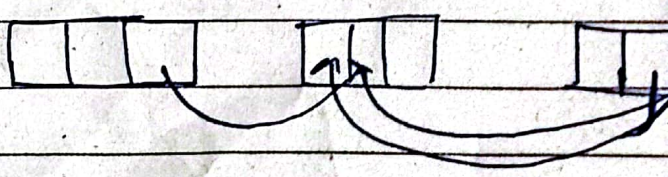
addrandom(Node):-
pos
temp=first
for(i=1 up to pos-1):-
temp=temp.next

temp.next node.next=temp.next
node.prev=temp
temp.next=node
temp.next.prev=node

2) Deleting operations

a) At first

last.next=first.next.next
first.next.prev=last
fi



OR

first=first.next
first.prev=last
last.~~prev~~next=first

Shubha

b) At last

while
last = last.prev
last.next = first
first.prev = last

c) At specified position

pos
temp = first
for(i=1 upto pos)
    temp = temp.next

(temp.next)prev = temp.prev
(temp.prev)next = temp.next

Shubha