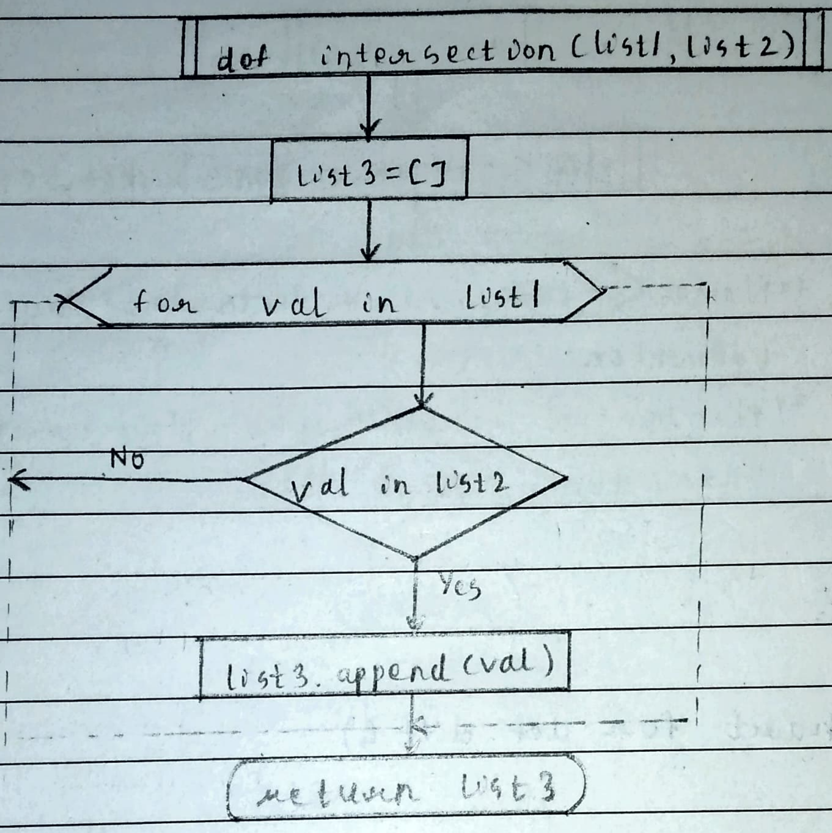
III

```
#INPUT:
Uni = []
n = int(input("Enter number of students: "))
for i in range(0,n):
   element = input()
   Uni.append(element)
print(Uni)
cricket = []
b = int(input("Enter number students who play cricket: "))
for j in range(0,b):
   ele=input()
   cricket.append(ele)
print(cricket)
bad = []
c = int(input("Enter number students who play badminton: "))
for k in range(0,c):
   elem=input()
   bad.append(elem)
print(bad)
foot = []
d = int(input("Enter number students who play football: "))
for j in range(0,d):
   eleme=input()
   foot.append(eleme)
print(foot)

def CB():
   list3 = intersection(cricket,bad)
   print("Names of common students who play cricket and badminton: ", list3)
   print("Number of students who play cricket and badminton: ",len(list3))

def CF():
   list3 = intersection(cricket,foot)
   print("Names of common students who play cricket and football: ", list3)
   print("Number of students who play cricket and football: ",len(list3))

def BF():
   list3 = intersection(bad,foot)
   print("Names of common students who play football and badminton: ", list3)
   print("Number of students who play badminton and football: ",len(list3))

def intersection(list1,list2):
   list3=[]
   for val in list1:
      if val in list2:
         list3.append(val)
   return list3

def eCeB():
   D1=diff(cricket,bad)
   D2=diff(bad,cricket)
   # print("C-B = ",D1)
```

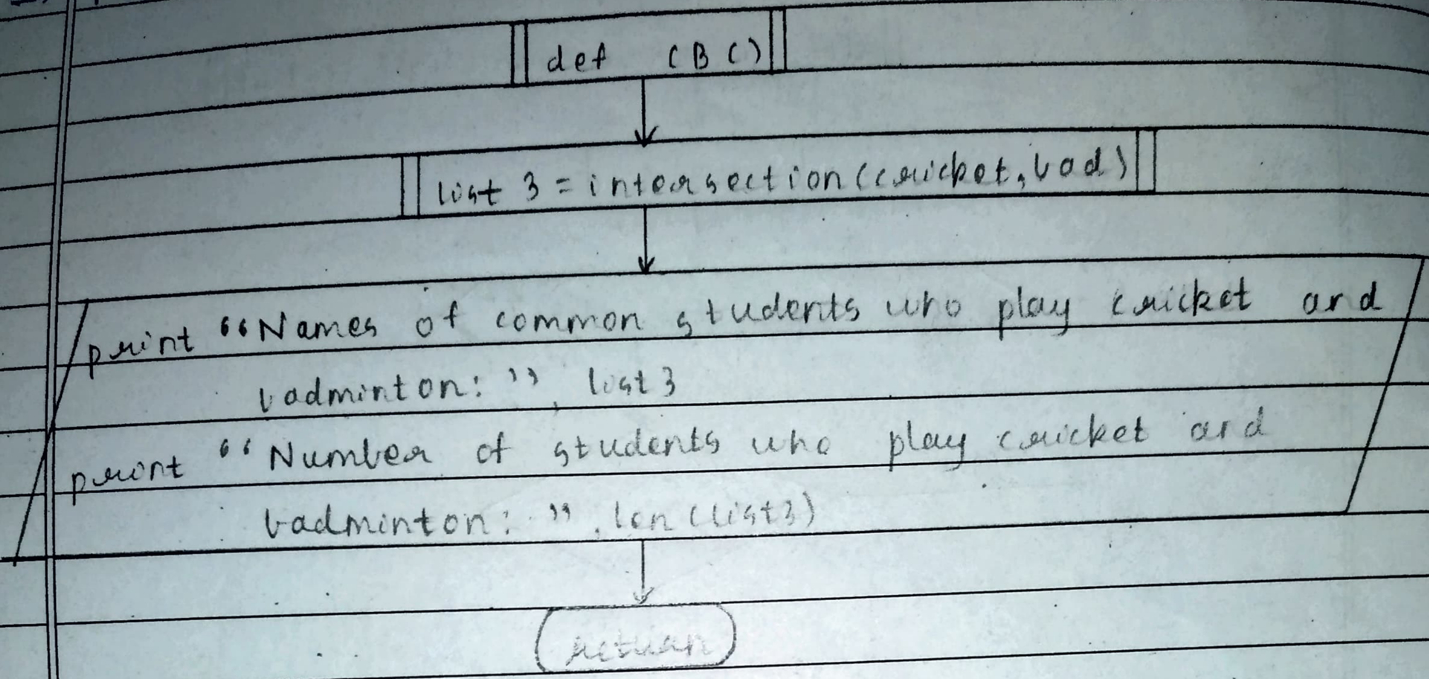
```
  # print("B-C = ",D2)
  DUB=union(D1,D2)
  print("People who play either cricket or badminton but not both: ",DUB)
def eCeF():
  D1=diff(cricket,foot)
  D2=diff(foot,cricket)
  # print("C-B = ",D1)
  # print("B-C = ",D2)
  DUB=union(D1,D2)
  print("People who play either cricket or football but not both: ",DUB)
def eFeB():
  D1=diff(foot,bad)
  D2=diff(bad,foot)
  # print("C-B = ",D1)
  # print("B-C = ",D2)
  DUB=union(D1,D2)
  print("People who play either football or badminton but not both: ",DUB)
def diff(list1, list2):
  list3 = []
  for val in list1:
    if val not in list2:
      list3.append(val)
  return list3
def union(list1,list2):
  list3 = list1.copy()
  for val in list2:
    if val not in list3:
      list3.append(val)
  return list3
def nCnB():
      list4 = diff(Uni,union(cricket,bad))
      print("Students who play neither cricket nor badminton: ",len(list4))
def nCnF():
      list4 = diff(Uni,union(cricket,foot))
      print("Students who play neither cricket nor football: ",len(list4))
def nFnB():
      list4 = diff(Uni,union(foot,bad))
      print("Students who play neither football nor badminton: ",len(list4))
def pCpF():
      list4 = intersection(cricket,foot)
      list5 = diff(list4,bad)
      print("People who play cricket and football but not badminton: ", len(list5))
def pCpB():
      list4 = intersection(cricket,bad)
      list5 = diff(list4,foot)
      print("People who play cricket and badminton but not football: ",len(list5))
def pBpF():
      list4 = intersection(foot,bad)
      list5 = diff(list4,cricket)
      print("People who play badminton and football but not cricket: ",len(list5))
flag = 1
while flag == 1:
```

```
print("1. List of students who play both cricket and badminton: ")
print("2. List of students who play either cricket or badminton but not football: ")
print("3. Number of students who play neither cricket not badminton: ")
print("4. Number of students who play cricket and football but not badmitnon: ")
print("5. Exit")
ch = int(input("Enter your choice: "))
if(ch == 1):
        CB()
elif(ch == 2):
        eCeB()
elif(ch == 3):
        nCnB()
elif(ch == 4):
        pCpF()
else:
        flag = 0
```

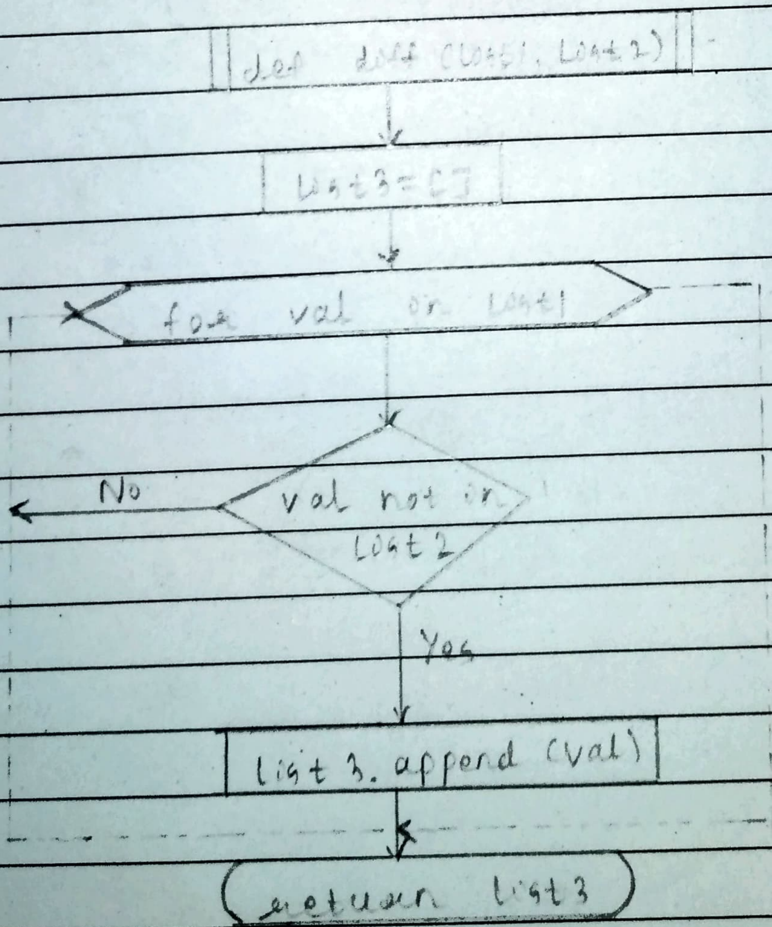
Flowchart for def ~~EB()~~ intersection().



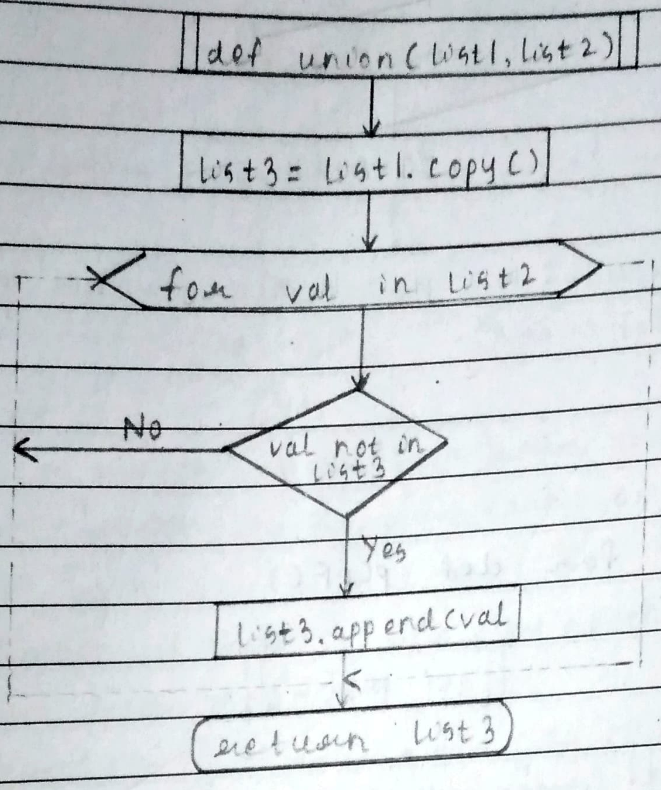
→ Flowchart for def CB()


def CB()
list 3 = intersection(cricket, bad)
print "Names of common students who play cricket and badminton: ", list 3
print "Number of students who play cricket and badminton: ", len(list3)
return

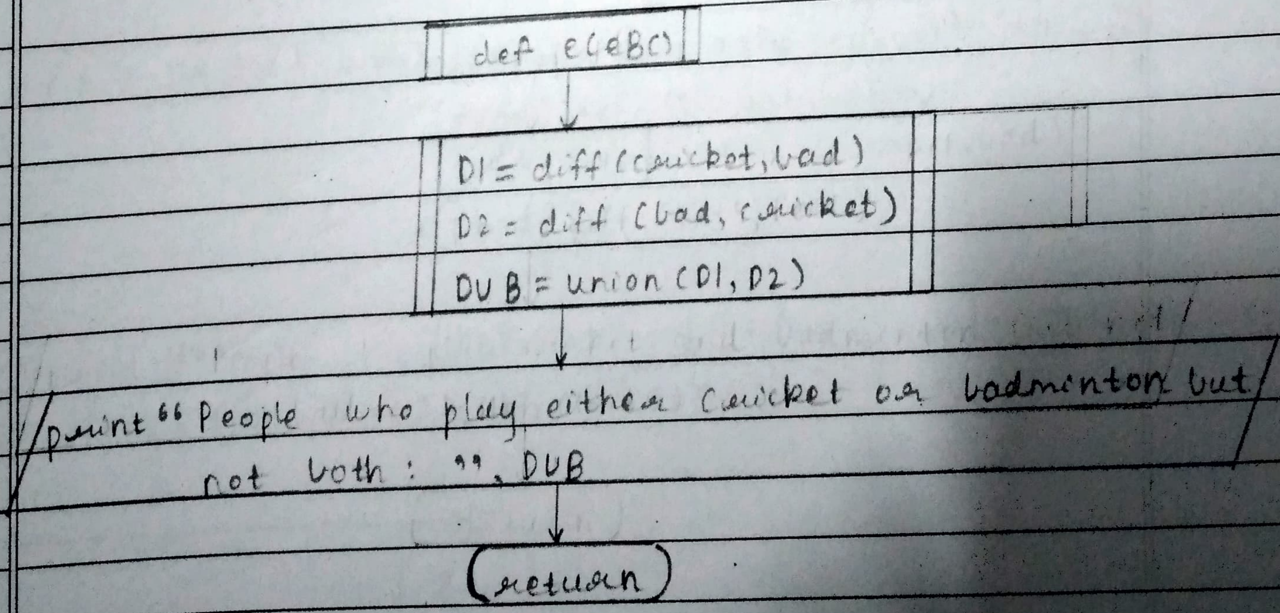
→ Flowchart for def diff ()



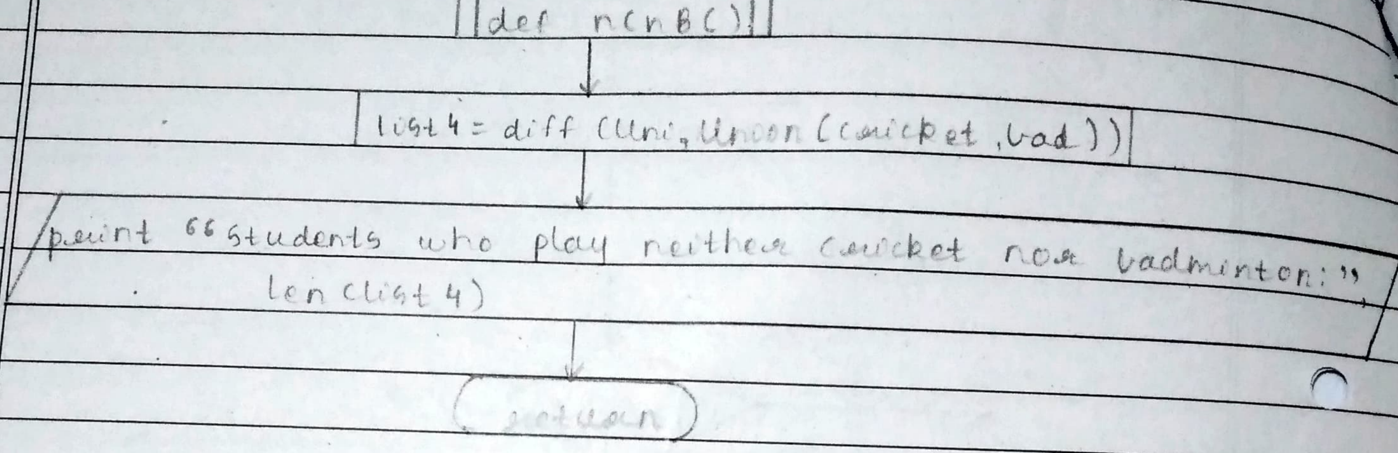
→ Flowchart for def union()



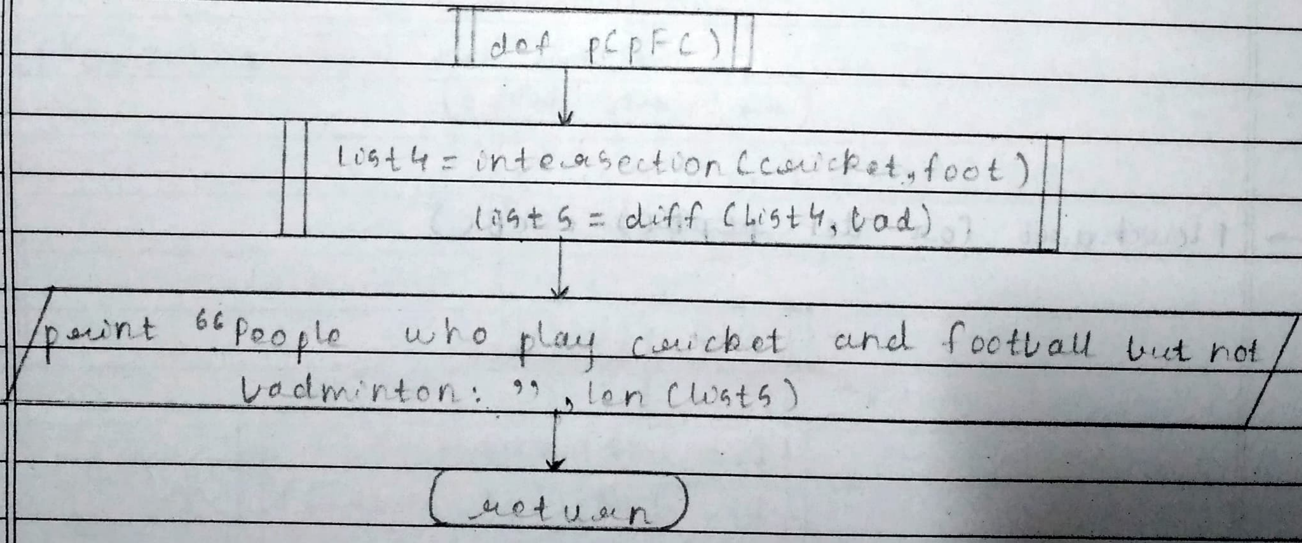
→ Flowchart for def ~~p(pB()~~ e(eB()



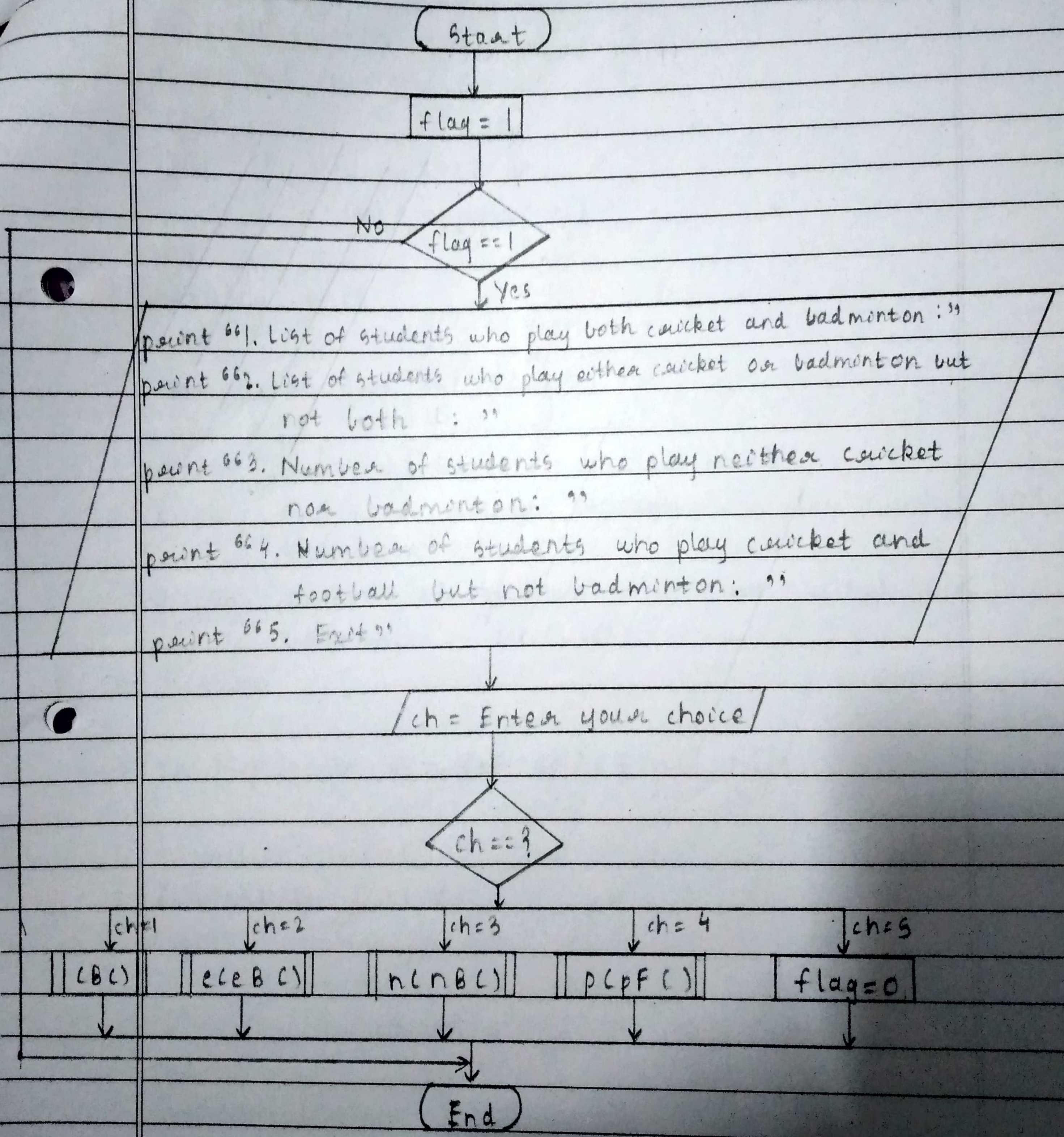
→ Flowchart for def n(nB()


def n(nB()
list4 = diff (Uni, Union (cricket ,bad))
print "Students who play neither cricket nor badminton:" len (list 4)
return

→ Flowchart for def p(pF()


def p(pF()
list4 = intersection (cricket, foot)
list5 = diff (list4, bad)
print "People who play cricket and football but not badminton:" , len (list5)
return

→ Flowchart for menu


Start
flag = 1
flag ==1
No
Yes
print "1. List of students who play both cricket and badminton :"
print "2. List of students who play either cricket or badminton but not both : "
print "3. Number of students who play neither cricket nor badminton: "
print "4. Number of students who play cricket and football but not badminton: "
print "5. Exit"
ch = Enter your choice
ch==?
ch=1
ch=2
ch=3
ch= 4
ch=5
c(B()
e(eB()
n(nB()
p(pF()
flag=0
End

→ Pseudocode for def intersection (List1, list2)

```
1. Initialize    list3 = []
2. for   val  in  list1  do
   begin
           if  val  in  List2  then
                 list3.append (val)
   end
3. return   list3
```

→ Pseudocode for def CB()

```
1. Store    list3 = intersection (cricket, bad)
2. Display  Names of common students who play cricket and
            badminton: , List 3
   Display  Number of students who play cricket and
            badminton: , len (list3)
3. return
```

→ ~~Em~~ Pseudocode for def diff (list1, list2)

```
1. Initialize  list3 = []
2. for val in  list1 do
   begin
          if val not in list 2 then
                list3.append (val)
   end
3. return  list 3
```

→ Pseudocode for def union(list1, list2)

```
1. store   list3 = list1.copy()
2. for val in list2 do
   begin
        if val not ~~not~~ in list3 then
             list3.append(val)
   end
3. return  list3
```

→ Pseudocode for def eCeB()

```
1. store  D1 = diff(cricket, bad)
   store  D2 = diff(bad, cricket)
2. call function   DUB = union(D1, D2)
3. Display  People who play either cricket or badminton
            but not both: , DUB
4. return
```

→ Pseudocode for def nCnB()

```
1. store  list4 = diff(Uni, union(cricket, bad))
2. Display  Students who play neither cricket nor
            badminton: , len(list4)
3. return
```

→ Pseudocode for def pCpF()

```
1. Store list4 = intersection (cricket, foot)
2. Store list5 = diff (list4, bad)
3. Display People who play cricket and football but not
       badminton:, len (list5)
4. return
```

→ Pseudocode for menu

```
1. Start
   Initialize flag=1
2. while flag =1 do
   begin
        Display 1. List of students who play both cricket
                   and badmonton:
        Display 2. List of students who play either cricket
                   or badmonton but not ~~football~~ both:
        Display 3. Number of students who play
                   neither cricket nor badmonton:
        Display 4. Number of students who play cricket
                   and football but not badmonton:
        Display 5. Exit
        ch= Enter your choice
        if (ch==1) then
                call function (BC)
        elif (ch==2) then
                call function eCeB()
        elif (ch==3) then
                call function nCnBC)
        elif (ch==4) then
                call function pCpFC)
        else:
                flag =0
   end
3. Stop
```

Q1. what is structure?

Ans.: A data structure is merely an instance of an ADT.

- An ADT or data structure is formally defined to be a triplet (D, F, A) where "D" stands for a set of Domain, "F" denotes the set of operations and "A" represents the axioms defining the functions on "F".
- An example of the data structure "Natural Number (NATNO)".

Q2. How to delete an element from array? (Explain Logic)

Ans → Consider array1 = ["Tanmay", "machkar", "Rajesh", "Tejas"]

```
array1=["Tanmay", "machkar", "Rajesh", "Tejas"]
len1 = len (array1)  # storing length of array
element = int (input ("Enter index of element to be
                        deleted: "))

while (element < len1-1):
        array1[element] = array1[element+1]
        # Shifting all elements to the left
        element = element+1  # incrementing element
len1 = len1-1  # Decrementing length of array after
                 element is deleted

print ("Elements of array are: ")
for i in range (len1):
        print (array1[i])  # printing elements of
                             the array in loop.
```

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#Output:

```
Enter index of element to be deleted: 0
Elements of array are:
Machkar
Rajesh
Tejas
```

→ In the above example:

array 1 = "Tanmay" "Machkar" "Rajesh" "Tejas"
index → 0 1 2 3
↑
index of ~~element~~ to be deleted

→ After the index is entered, starting from the index, the elements to the right are shifted to the left.

array 1 = "Machkar" "Rajesh" "~~Rajesh~~ Tejas"
0 1 2

→ The number of elements is reduced by one and then the elements are printed by including the print statement inside the for loop with the range being the updated number of elements.