LAB-10 Parametric tests

a) paired - t - test.

```
print("enter the data1")
data1 = scan()
print(" enter the data2")
data2 = scan()
print("enter the significance percentage")
alpha = scan()
n = length(data1)
di = data1 - data2
dbar = sum(di)/n
sd = 0
for(i in di){
    sd = sd + ((i-dbar)^2)
}
sd = sd/(n-1)
sd = sd^0.5
res = dbar*(n^0.5)
t = res/sd
tab_val = qt(1-(alpha/2), n-1)
print(paste(" dbar calculated :",dbar))
print(paste(" sd calculated :",sd))
print(paste(" t value calculated :", t))
```

```
print(paste(" t-table value : ", tab-val))
if (t > tab-val) {
   Print (paste (" there is some significance difference between paired
                 observations"))
  } else {
   print ("there is NO significance difference between paired observations")
}
```

output

enter the data1

127 168 143 165 122 139

enter the data2

154 135 132 171 153 149

enter the significance percentage

001

dbar calculated -5

sd calculated 24.024986

t val calculated -0.50977

t-table value 4.032142

There is no significance difference between paired observations

b) F-test

```
print("enter the data1")
data1 = scan()
print("enter the data2")
data2 = scan()
print("enter the significance percentage")
alpha = scan()
n1 = length(data1)
n2 = length(data2)
xbar = sum(data1)/n1
ybar = sum(data2)/n2
sd1 = 0
sd2 = 0
for(i in data1){
   sd1 = sd1+((i-xbar)^2)
}
for(j in data2){
   sd2 = sd2+((j-ybar)^2)
}
sd1 = sd1/(n1-1)
sd2 = sd2(n2-1)
f = sd1/sd2
tab-val = qf((1-alpha), n1-1, n2-1)
```

```
print(paste(" mean of data1", xbar))
print(paste(" mean of data2", ybar))
print(paste(" value of s1 square", sd1))
print(paste(" value of s2 square", sd2))
print(paste(" value of f calculated:", f1))
print( paste(" f table value:", tab-val))

if (f > tab-val)
{
  print(" there is some significance difference b/w two variances")
}else{
 print(" there is no significance difference between two variances")
```

Output

enter the data 1

16 26 27 28 24 22 23

enter the data 2

33 42 35 32 28 31

enter the significance percentage

0.05

mean of data 1 : 23

mean of data 2 : 33.5

value of s_1 square : 12.6666

value of s_2 square : 22.7

value of f calculated : 0.5580029

f table value : 4.950288

there is no significance diff between two variances

LAB-11 non parametric test

Wilcoxon signed rank test

```
my.sort = function(data){
    l = length(data)
    for(i in 1:(l-1)){
      min=i
      for(j in (i+1):l){
        if (abs(data[j]) * abs(data[min]))
        {
          min=j
        }
      }
    temp = data[min]
    data[min] = data[i]
    data[i] = temp
  }
  return(data)
}
print("enter the data")
xi = scan()
print("enter the median")
m = scan()
di = xi - m
arr = my_sort(di)
absolute = abs(arr)
ranks = (1: length(xi))
```

```
tplus=0
tminus=0
j=1
for(i in arr){
  if(i<0){
    tminus=tminus+j
    j=j+1
  }else{
    tplus=tplus+j
    j=j+1
  }
}

t=min(tplus,tminus)
tab-val=((qsignrank(0,0.25,length(xi))-1)
data=data.frame(xi,di,arr,absolute,ranks)
print(data,row.names=FALSE)
print(paste("sum of T+",tplus))
print(paste("sum of T-:",tminus))
print(paste("minimum of two:",t))
print(Paste("table value:",tab_val))
if(t>tab-val){
  print("we accept H0")
}else{
  print("we reject H0")
}
```

output

enter the data

36 29 44 28 40 50 39 47 33

enter the median

35

xi	di	arr	absolute	ranks
36	1	1	1	1
29	-6	-2	2	2
44	9	4	4	3
28	-7	5	5	4
40	5	6	6	5
50	15	-7	7	6
39	4	9	9	7
47	12	12	12	8
33	-2	15	15	9

sum of T+: 32

sum of T-: 13

minimum of two: 13

table value: 5

We accept Ho