Q1: You are giving a class “Point” in 2D plane, this class contains the following functions (6 marks)

1-distance(a,b)

2- The cosine between two points knowing that





def dist(p1,p2):

return np.sqrt(np.sum((p1-p2)\*\*2))

def norm(a):

return np.sqrt((a\*\*2).sum())

def cos(a,b):

return a.dot(b)/(norm(a)\*norm(b))

Q2: Suppose you have a text file “first.txt” which contains 30 student marks in subject A, and you have another file “second.txt”. Write the following functions: (Note: consider line number is the student number, who have the same line number in other file) (8 marks)

1) A function receives file name as a string and returns the data as a numpy array

def read\_file(file):

return np.load(file)

2) A function that shows the number of successful students, failed students and students who did not take the exam

def not\_take(a):

np.sum(np.isnan(a))

3) A function that calculate number of students who passed both exams, at least one exam, and none( consider the students who did not attend or have null mark as a none passing student)

pass\_both = np.logical\_and([a>60],[b>60]).sum()

pass\_one = np.logical\_xor([a>60],[b>60]).sum()

4) A function that finds how many student having grades less than 50% of the mean

(example: lets say that the mean is 70%, count the students who have marks less than 35%)

half\_mean = a.mean()/2

res = [a<half\_mean].sum()

Q3: Consider this code: (6 marks)

def fun1(s):

if s == "A":

for c in s:

print(c)

def fun2(s):

for c in s:

if s == "A":

print(c)

def fun3(s):

for c in s:

if c == "A":

print(c)

def fun4(s):

if c == "A":

for c in s:

print(c)

For each of the following questions, write down what the function call will produce, and why. If there

would be an error, explain what error you would get and why.

(a)fun1("ABBA dance")

(b)fun2("ABBA dance")

(c)fun3("ABBA dance")

(d)fun4("ABBA dance")

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