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**ANL 252 Python For Data Analytics**

**Tutor-Marked Assignment**

**July 2021 Presentation**

**Done by:**

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**(a)**

**The program:**

#Importing Meth package

#Find a much more exact value for pi in the math package

import math

print('More exact value for pi', math.pi)

**The outcome:**

(base) Alans-Air:~ alanonggl$ python3.6 3.py

More exact value for pi 3.141592653589793

(base) Alans-Air:~ alanonggl$

**(b)**

**The program:**

Ask the user to enter the mean and variance of the distribution

#The mean can be any value between minus infinity and plus infinity

#The variance must be a value larger than 0

#Ensure variance condition is fulfilled and the input is numeric

#User enters "Enter" with no value, the program will be setting up mean to 0 and variance to 1

import math

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

if name.isalpha():

print("You have keyed in an accepted \033[94mNAME\033[0m!")

else:

print("Please key in alphabets only!")

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

mean = 0

variance = 1

mean\_keyin = input("Kindly input the \033[91mMEAN\033[0m it has to be a number!")

if mean\_keyin.isnumeric():

print("You have keyed in an accepted \033[91mMEAN\033[0m!")

elif mean\_keyin == '':

mean\_keyin = float(mean)

print("You have keyed in \033[91mMEAN\033[0m as Zero!")

else:

print("Please key in a number!")

mean\_keyin = input("The values of your \033[91mMEAN\033[0m ?")

variance\_keyin = input("Kindly input the \033[95mVARIANCE\033[0m, it has to be bigger than zero!")

if variance\_keyin.isnumeric():

print("You have keyed in an accepted \033[95mVARIANCE\033[0m!")

elif variance\_keyin == '':

variance\_keyin = float(variance)

print("You have keyed in \033[95mVARIANCE\033[0m as One!")

else:

print("Please key in a number bigger than zero!")

variance\_keyin = input("Kindly input the \033[95mVARIANCE\033[0m, it has to be bigger than zero!")

print(f"Hello \033[94m{name}\033[0m, your inputed VARIANCE is \033[95m{variance\_keyin}\033[0m and MEAN is \033[91m{mean\_keyin}\033[0m!")

**Outcome:**

(base) Alans-Air:~ alanonggl$ python3.6 anl252tma.py

What is your NAME in alphabets only?Alan

You have keyed in an accepted NAME!

Kindly input the MEAN it has to be a number!

You have keyed in MEAN as Zero!

Kindly input the VARIANCE, it has to be bigger than zero!

You have keyed in VARIANCE as One!

Hello Alan, your inputed VARIANCE is 1.0 and MEAN is 0.0!

(base) Alans-Air:~ alanonggl$ python3.6 anl252tma.py

What is your NAME in alphabets only?1

Please key in alphabets only!

What is your NAME in alphabets only?Alan

Kindly input the MEAN it has to be a number!ab

Please key in a number!

The values of your MEAN ?1

Kindly input the VARIANCE, it has to be bigger than zero!ab

Please key in a number bigger than zero!

Kindly input the VARIANCE, it has to be bigger than zero!1

Hello Alan, your inputed VARIANCE is 1 and MEAN is 1!

(base) Alans-Air:~ alanonggl$

**(c)**

**The program**

#Design an input screen for X

#Inform user that value between minus and plue infinity

#Ensure that the input is numeric

import math

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

if name.isalpha():

print("You have keyed in an accepted \033[94mNAME\033[0m!")

else:

print("Please key in alphabets only!")

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

X\_keyin = input("Kindly key in the value of \033[1mX\033[0m? It has to be in number!")

if X\_keyin.isnumeric():

print("You have keyed in an accepted \033[1mX\033[0m!")

else:

print("Please key in number only!")

X\_keyin = input("Kindly key in the value of \033[1mX\033[0m? It has to be in number!")

print(f"Hello \033[94m{name}\033[0m, your inputed value of X is \033[1m{X\_keyin}\033[0m!")

**The outcome**

(base) Alans-Air:~ alanonggl$ python3.6 3.py

What is your NAME in alphabets only?Alan

You have keyed in an accepted NAME!

Kindly key in the value of **X**? It has to be in number!a

Please key in number only!

Kindly key in the value of **X**? It has to be in number!2

Hello Alan, your inputed value of X is **2**!

(base) Alans-Air:~ alanonggl$

**(d)**

**The program**

#Construct a user-defined function based on the given formula

import math

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

if name.isalpha():

print("You have keyed in an accepted \033[94mNAME\033[0m!")

else:

print("Please key in alphabets only!")

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

mean = 0

variance = 1

mean\_keyin = input(

"Kindly input the \033[91mMEAN\033[0m it has to be a number!")

if mean\_keyin.isnumeric():

print("You have keyed in an accepted \033[91mMEAN\033[0m!")

elif mean\_keyin == '':

mean\_keyin = float(mean)

print("You have keyed in \033[91mMEAN\033[0m as Zero!")

else:

print("Please key in a number!")

mean\_keyin = input("The values of your \033[91mMEAN\033[0m ?")

variance\_keyin = input(

"Kindly input the \033[95mVARIANCE\033[0m, it has to be bigger than zero!")

if variance\_keyin.isnumeric():

print("You have keyed in an accepted \033[95mVARIANCE\033[0m!")

elif variance\_keyin == '':

variance\_keyin = float(variance)

print("You have keyed in \033[95mVARIANCE\033[0m as One!")

else:

print("Please key in a number bigger than zero!")

variance\_keyin = input(

"Kindly input the \033[95mVARIANCE\033[0m, it has to be bigger than zero!")

X\_keyin = input(

"Kindly key in the value of \033[1mX\033[0m? It has to be in number!")

if X\_keyin.isnumeric():

print("You have keyed in an accepted \033[1mX\033[0m!")

else:

print("Please key in number only!")

X\_keyin = input(

"Kindly key in the value of \033[1mX\033[0m? It has to be in number!")

print(f"Hello \033[94m{name}\033[0m, your inputed VARIANCE is \033[95m{variance\_keyin}\033[0m, MEAN is \033[91m{mean\_keyin}\033[0m and inputed X is \033[1m{X\_keyin}\033[0m!")

X\_keyin = float(X\_keyin)

mean\_keyin = float(mean\_keyin)

variance\_keyin = float(variance\_keyin)

def calculate():

if X\_keyin == 0 and mean\_keyin == 0:

numerator = 0

demoinator = 0

else:

numerator = math.e\*\*(-((X\_keyin\*X\_keyin - mean\_keyin\*mean\_keyin)

\* (X\_keyin\*X\_keyin - mean\_keyin\*mean\_keyin))/2\*variance\_keyin)

demoinator = math.sqrt(2\*math.pi\*variance\_keyin)

if numerator == 0 or demoinator == 0:

fofx = 0

else:

fofx = numerator/demoinator

fofx = round(fofx, 100)

print(f"Hello \033[94m{name}\033[0m, the calculated probability will be ", fofx)

calculate()

**The outcome**

(base) Alans-Air:~ alanonggl$ python3.6 3.py

What is your NAME in alphabets only?Alan

You have keyed in an accepted NAME!

Kindly input the MEAN it has to be a number!3

You have keyed in an accepted MEAN!

Kindly input the VARIANCE, it has to be bigger than zero!2

You have keyed in an accepted VARIANCE!

Kindly key in the value of X? It has to be in number!4

You have keyed in an accepted X!

Hello Alan, your inputed VARIANCE is 2, MEAN is 3 and inputed X is 4!

Hello Alan, the calculated probability will be 1.4789907395007714e-22

(base) Alans-Air:~ alanonggl$

**(e)**

**The program**

#Design a program to compute P(X ≤ k) where k is the value that the user entered in (c).

#Use the user input in (b) as the values for the parameters μ and σ2 and display the result to the user by formatted printing.

import math

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

if name.isalpha():

print("You have keyed in an accepted \033[94mNAME\033[0m!")

else:

print("Please key in alphabets only!")

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

mean = 0

variance = 1

mean\_keyin = input(

"Kindly input the \033[91mMEAN\033[0m it has to be a number!")

if mean\_keyin.isnumeric():

print("You have keyed in an accepted \033[91mMEAN\033[0m!")

elif mean\_keyin == '':

mean\_keyin = float(mean)

print("You have keyed in \033[91mMEAN\033[0m as Zero!")

else:

print("Please key in a number!")

mean\_keyin = input("The values of your \033[91mMEAN\033[0m ?")

variance\_keyin = input(

"Kindly input the \033[95mVARIANCE\033[0m, it has to be bigger than zero!")

if variance\_keyin.isnumeric():

print("You have keyed in an accepted \033[95mVARIANCE\033[0m!")

elif variance\_keyin == '':

variance\_keyin = float(variance)

print("You have keyed in \033[95mVARIANCE\033[0m as One!")

else:

print("Please key in a number bigger than zero!")

variance\_keyin = input(

"Kindly input the \033[95mVARIANCE\033[0m, it has to be bigger than zero!")

k\_keyin= input("Kindly key in the value of \033[1mk\033[0m? It has to be in number!")

if k\_keyin.isnumeric():

print("You have keyed in an accepted \033[1mk\033[0m!")

else:

print("Please key in number only!")

k\_keyin = input("Kindly key in the value of \033[1mk\033[0m? It has to be in number!")

print(f"Hello \033[94m{name}\033[0m, your inputed VARIANCE is \033[95m{variance\_keyin}\033[0m, MEAN is \033[91m{mean\_keyin}\033[0m and inputed k is \033[1m{k\_keyin}\033[0m!")

k\_keyin = float(k\_keyin)

mean\_keyin = float(mean\_keyin)

variance\_keyin = float(variance\_keyin)

def calculate(k\_keyin):

k=float(k\_keyin)

if k==0 and mean\_keyin==0:

numerator = 0

demoinator = 0

else:

numerator = math.e\*\*(-((k\*k - mean\_keyin\*mean\_keyin)\*(k\*k - mean\_keyin\*mean\_keyin))/2\*variance\_keyin)

demoinator = math.sqrt(2\*math.pi\*variance\_keyin)

if numerator==0 or demoinator==0:

fofk = 0

else:

fofk = numerator/demoinator

fofk = round(fofk, 100)

return fofk

**The outcome**

(base) Alans-Air:~ alanonggl$ python3.6 3.py

What is your NAME in alphabets only?Alan

You have keyed in an accepted NAME!

Kindly input the MEAN it has to be a number!3

You have keyed in an accepted MEAN!

Kindly input the VARIANCE, it has to be bigger than zero!2

You have keyed in an accepted VARIANCE!

Kindly key in the value of k? It has to be in number!4

You have keyed in an accepted k!

Hello Alan, your inputed VARIANCE is 2, MEAN is 3 and inputed k is 4!

(base) Alans-Air:~ alanonggl$

**(f)**

Below are the steps thought through for (e):

1. Start by importing math.
2. Fixing the value of Alpha and Negative Infinity.
3. Allow the users to key in the mean, variance and X based on the limitation set.
4. Setup the formula using numerator and denominator.
5. We will make use of the user-defined function - calculate.
6. Once the user inputs the mean, variance and X based on the limitation, the probability will be calculated based on the formula.
7. Setting up ‘Dictionary’.
8. Basing on a while loop to begin from the set negative infinity to the K’s value.
9. Making use of the user-defined function - calculate.
10. The while loop will hand over the inputs to go through the user-defined function - calculate.
11. As this is a while loop, the output will be stored in the dictionary.
12. With the fixed alpha, the number of output will continue to increase in the dictionary.

**(144 words)**

**(g)**

**The program**

#Create a dictionary to store the probabilities

import math

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

if name.isalpha():

print("You have keyed in an accepted \033[94mNAME\033[0m!")

else:

print("Please key in alphabets only!")

name = input("What is your \033[94mNAME\033[0m in alphabets only?")

mean = 0

variance = 1

mean\_keyin = input(

"Kindly input the \033[91mMEAN\033[0m it has to be a number!")

if mean\_keyin.isnumeric():

print("You have keyed in an accepted \033[91mMEAN\033[0m!")

elif mean\_keyin == '':

mean\_keyin = float(mean)

print("You have keyed in \033[91mMEAN\033[0m as Zero!")

else:

print("Please key in a number!")

mean\_keyin = input("The values of your \033[91mMEAN\033[0m ?")

variance\_keyin = input(

"Kindly input the \033[95mVARIANCE\033[0m, it has to be bigger than zero!")

if variance\_keyin.isnumeric():

print("You have keyed in an accepted \033[95mVARIANCE\033[0m!")

elif variance\_keyin == '':

variance\_keyin = float(variance)

print("You have keyed in \033[95mVARIANCE\033[0m as One!")

else:

print("Please key in a number bigger than zero!")

variance\_keyin = input(

"Kindly input the \033[95mVARIANCE\033[0m, it has to be bigger than zero!")

k\_keyin= input("Kindly key in the value of \033[1mk\033[0m? It has to be in number!")

if k\_keyin.isnumeric():

print("You have keyed in an accepted \033[1mk\033[0m!")

else:

print("Please key in number only!")

k\_keyin = input("Kindly key in the value of \033[1mk\033[0m? It has to be in number!")

print(f"Hello \033[94m{name}\033[0m, your inputed VARIANCE is \033[95m{variance\_keyin}\033[0m, MEAN is \033[91m{mean\_keyin}\033[0m and inputed k is \033[1m{k\_keyin}\033[0m!")

k\_keyin = float(k\_keyin)

mean\_keyin = float(mean\_keyin)

variance\_keyin = float(variance\_keyin)

def calculate(k\_keyin):

k=float(k\_keyin)

if k==0 and mean\_keyin==0:

numerator = 0

demoinator = 0

else:

numerator = math.e\*\*(-((k\*k - mean\_keyin\*mean\_keyin)\*(k\*k - mean\_keyin\*mean\_keyin))/2\*variance\_keyin)

demoinator = math.sqrt(2\*math.pi\*variance\_keyin)

if numerator==0 or demoinator==0:

fofk = 0

else:

fofk = numerator/demoinator

fofk = round(fofk, 100)

return fofk

nf = -20.0

avalue = 0.05

k = float(k\_keyin)

nf= float(nf)

print("The set Negative infinity will be: ", nf)

avalue = float(avalue)

print("The set Alpha wil be: ", avalue)

number = nf

generated\_result = 0.0

Dictionary = dict()

while number<=k:

generated\_result += calculate(number)

generated\_result = avalue\*generated\_result

Dictionary [round(number, 100)] = round(generated\_result, 100)

number += avalue

print(f"Hello \033[94m{name}\033[0m, the calculated probability will be ", generated\_result)

for key in Dictionary:

print(key, end=" ")

print(Dictionary[key])

**The outcome**

(base) Alans-Air:~ alanonggl$ python3.6 3.py

What is your NAME in alphabets only?Alan

You have keyed in an accepted NAME!

Kindly input the MEAN it has to be a number!3

You have keyed in an accepted MEAN!

Kindly input the VARIANCE, it has to be bigger than zero!2

You have keyed in an accepted VARIANCE!

Kindly key in the value of k? It has to be in number!4

You have keyed in an accepted k!

Hello Alan, your inputed VARIANCE is 2, MEAN is 3 and inputed k is 4!

The set Negative infinity will be: -20.0

The set Alpha wil be: 0.05

Hello Alan, the calculated probability will be 8.030769619529982e-18

-20.0 0.0

-19.95 0.0

-19.9 0.0

-19.849999999999998 0.0

-19.799999999999997 0.0

-19.749999999999996 0.0

-19.699999999999996 0.0

-19.649999999999995 0.0

-19.599999999999994 0.0

-19.549999999999994 0.0

-19.499999999999993 0.0

-19.449999999999992 0.0

-19.39999999999999 0.0

-19.34999999999999 0.0

-19.29999999999999 0.0

-19.24999999999999 0.0

-19.19999999999999 0.0

-19.149999999999988 0.0

-19.099999999999987 0.0

-19.049999999999986 0.0

-18.999999999999986 0.0

-18.949999999999985 0.0

-18.899999999999984 0.0

-18.849999999999984 0.0

-18.799999999999983 0.0

-18.749999999999982 0.0

-18.69999999999998 0.0

-18.64999999999998 0.0

-18.59999999999998 0.0

-18.54999999999998 0.0

-18.49999999999998 0.0

-18.449999999999978 0.0

-18.399999999999977 0.0

-18.349999999999977 0.0

-18.299999999999976 0.0

-18.249999999999975 0.0

-18.199999999999974 0.0

-18.149999999999974 0.0

-18.099999999999973 0.0

-18.049999999999972 0.0

-17.99999999999997 0.0

-17.94999999999997 0.0

-17.89999999999997 0.0

-17.84999999999997 0.0

-17.79999999999997 0.0

-17.749999999999968 0.0

-17.699999999999967 0.0

-17.649999999999967 0.0

-17.599999999999966 0.0

-17.549999999999965 0.0

-17.499999999999964 0.0

-17.449999999999964 0.0

-17.399999999999963 0.0

-17.349999999999962 0.0

-17.29999999999996 0.0

-17.24999999999996 0.0

-17.19999999999996 0.0

-17.14999999999996 0.0

-17.09999999999996 0.0

-17.049999999999958 0.0

-16.999999999999957 0.0

-16.949999999999957 0.0

-16.899999999999956 0.0

-16.849999999999955 0.0

-16.799999999999955 0.0

-16.749999999999954 0.0

-16.699999999999953 0.0

-16.649999999999952 0.0

-16.59999999999995 0.0

-16.54999999999995 0.0

-16.49999999999995 0.0

-16.44999999999995 0.0

-16.39999999999995 0.0

-16.349999999999948 0.0

-16.299999999999947 0.0

-16.249999999999947 0.0

-16.199999999999946 0.0

-16.149999999999945 0.0

-16.099999999999945 0.0

-16.049999999999944 0.0

-15.999999999999943 0.0

-15.949999999999942 0.0

-15.899999999999942 0.0

-15.849999999999941 0.0

-15.79999999999994 0.0

-15.74999999999994 0.0

-15.699999999999939 0.0

-15.649999999999938 0.0

-15.599999999999937 0.0

-15.549999999999937 0.0

-15.499999999999936 0.0

-15.449999999999935 0.0

-15.399999999999935 0.0

-15.349999999999934 0.0

-15.299999999999933 0.0

-15.249999999999932 0.0

-15.199999999999932 0.0

-15.149999999999931 0.0

-15.09999999999993 0.0

-15.04999999999993 0.0

-14.999999999999929 0.0

-14.949999999999928 0.0

-14.899999999999928 0.0

-14.849999999999927 0.0

-14.799999999999926 0.0

-14.749999999999925 0.0

-14.699999999999925 0.0

-14.649999999999924 0.0

-14.599999999999923 0.0

-14.549999999999923 0.0

-14.499999999999922 0.0

-14.449999999999921 0.0

-14.39999999999992 0.0

-14.34999999999992 0.0

-14.299999999999919 0.0

-14.249999999999918 0.0

-14.199999999999918 0.0

-14.149999999999917 0.0

-14.099999999999916 0.0

-14.049999999999915 0.0

-13.999999999999915 0.0

-13.949999999999914 0.0

-13.899999999999913 0.0

-13.849999999999913 0.0

-13.799999999999912 0.0

-13.749999999999911 0.0

-13.69999999999991 0.0

-13.64999999999991 0.0

-13.599999999999909 0.0

-13.549999999999908 0.0

-13.499999999999908 0.0

-13.449999999999907 0.0

-13.399999999999906 0.0

-13.349999999999905 0.0

-13.299999999999905 0.0

-13.249999999999904 0.0

-13.199999999999903 0.0

-13.149999999999903 0.0

-13.099999999999902 0.0

-13.049999999999901 0.0

-12.9999999999999 0.0

-12.9499999999999 0.0

-12.899999999999899 0.0

-12.849999999999898 0.0

-12.799999999999898 0.0

-12.749999999999897 0.0

-12.699999999999896 0.0

-12.649999999999896 0.0

-12.599999999999895 0.0

-12.549999999999894 0.0

-12.499999999999893 0.0

-12.449999999999893 0.0

-12.399999999999892 0.0

-12.349999999999891 0.0

-12.29999999999989 0.0

-12.24999999999989 0.0

-12.19999999999989 0.0

-12.149999999999888 0.0

-12.099999999999888 0.0

-12.049999999999887 0.0

-11.999999999999886 0.0

-11.949999999999886 0.0

-11.899999999999885 0.0

-11.849999999999884 0.0

-11.799999999999883 0.0

-11.749999999999883 0.0

-11.699999999999882 0.0

-11.649999999999881 0.0

-11.59999999999988 0.0

-11.54999999999988 0.0

-11.49999999999988 0.0

-11.449999999999878 0.0

-11.399999999999878 0.0

-11.349999999999877 0.0

-11.299999999999876 0.0

-11.249999999999876 0.0

-11.199999999999875 0.0

-11.149999999999874 0.0

-11.099999999999874 0.0

-11.049999999999873 0.0

-10.999999999999872 0.0

-10.949999999999871 0.0

-10.89999999999987 0.0

-10.84999999999987 0.0

-10.79999999999987 0.0

-10.749999999999869 0.0

-10.699999999999868 0.0

-10.649999999999867 0.0

-10.599999999999866 0.0

-10.549999999999866 0.0

-10.499999999999865 0.0

-10.449999999999864 0.0

-10.399999999999864 0.0

-10.349999999999863 0.0

-10.299999999999862 0.0

-10.249999999999861 0.0

-10.19999999999986 0.0

-10.14999999999986 0.0

-10.09999999999986 0.0

-10.049999999999859 0.0

-9.999999999999858 0.0

-9.949999999999857 0.0

-9.899999999999856 0.0

-9.849999999999856 0.0

-9.799999999999855 0.0

-9.749999999999854 0.0

-9.699999999999854 0.0

-9.649999999999853 0.0

-9.599999999999852 0.0

-9.549999999999851 0.0

-9.49999999999985 0.0

-9.44999999999985 0.0

-9.39999999999985 0.0

-9.349999999999849 0.0

-9.299999999999848 0.0

-9.249999999999847 0.0

-9.199999999999847 0.0

-9.149999999999846 0.0

-9.099999999999845 0.0

-9.049999999999844 0.0

-8.999999999999844 0.0

-8.949999999999843 0.0

-8.899999999999842 0.0

-8.849999999999842 0.0

-8.79999999999984 0.0

-8.74999999999984 0.0

-8.69999999999984 0.0

-8.649999999999839 0.0

-8.599999999999838 0.0

-8.549999999999837 0.0

-8.499999999999837 0.0

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