

UGANDA TECHNOLOGY AND MANAGEMENT UNIVERSITY
SCHOOL OF COMPUTING & ENGINEERING
END OF SEMESTER EXAMINATIONS

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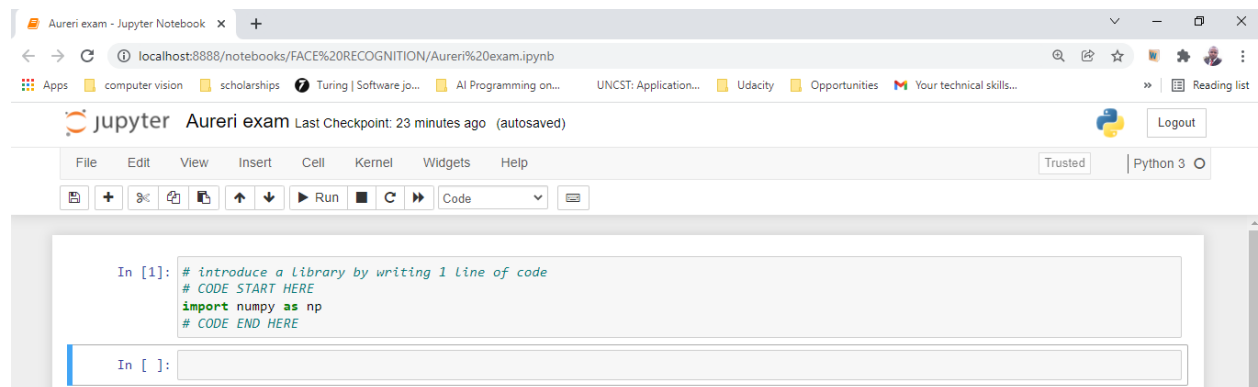
Masters of Science in Computing-Computer Security

CS 509 Mobile Cloud Computing

SECTION A

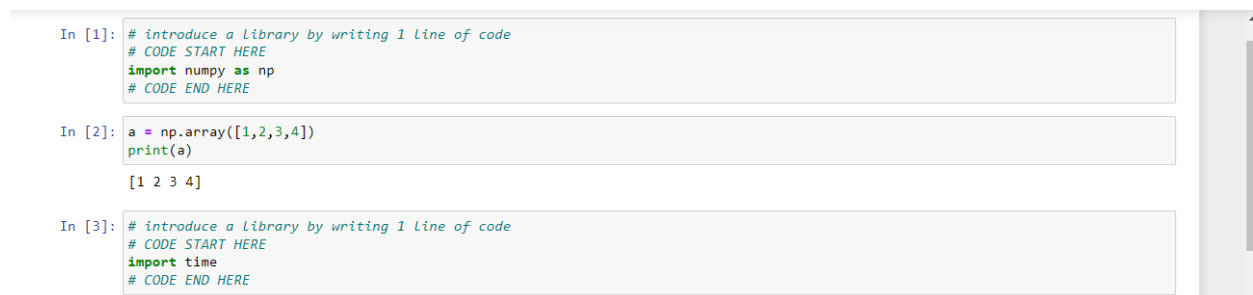
- a) Write one line of code in Input (In[1]) that can generate the output seen in input(In[2]). (Hint: Submit in the screen shot of your codes). (8 marks)**

SOLUTION



- b) Write one line of code in Input (In[3]) . Hence run codes line 4 and 5. (Hint: Submit in the screen shot of your codes). (8 marks)**

SOLUTION



- c) Write one line of code in input (In[6] and run the codes to produce outputs. (Hint: Submit in the screen shot of your codes). (8 marks)

SOLUTION



```
In [1]: # introduce a library by writing 1 line of code
# CODE START HERE
import numpy as np
# CODE END HERE

In [2]: a = np.array([1,2,3,4])
print(a)

[1 2 3 4]

In [3]: # introduce a library by writing 1 line of code
# CODE START HERE
import time
# CODE END HERE

In [4]: A = np.random.rand(1000000)
B = np.random.rand(1000000)
tic = time.time()
c = np.dot(A,B)
toc = time.time()
print(c)

249982.05778969277
```

- d) Explain why the output of input (In[5]) produces a smallest value. (8 marks)

SOLUTION

The time it takes for the CPU to execute the line of code “c = np.dot(A,B)” is too small. The central processing unit (CPU) starts counting from the line of code “tic = time.time()” and stops at “toc = time.time()”. Note that, toc-tic is a very small value, which is the interval the CPU takes to complete the instruction in between tic and toc.

- e) Explain why every time you run the codes you get various outputs. (8 marks)

SOLUTION

In [In [4]], there is a function that is used to produce random numbers. In this case, lines A=np.random.rand(1000000) and B=np.random.rand(1000000) produce random numbers assigned to their variables accordingly. Therefore, this makes the outputs different every time the code is run.

SECTION B

Question Three

- a) **The architecture of a cloud is developed at three layers: infrastructure, platform and application. Explain the following models:**

i. Infrastructure as a Service (IaaS). (4 marks)

IaaS (Infrastructure as a Service) - Infrastructure as a Service is a provision model of cloud computing in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis. for example Amazon Web Services, BlueLock, Cloud scaling and Datapipe

ii. Platform as a Service (PaaS). (4 marks)

PaaS (Platform as a Service) - Platform as a Service is one of the GROWING sector of cloud computing. PaaS basically help developer to speed the development of app, saving money and most important innovating their applications and business instead of setting up configurations and managing things like servers and databases. In one line I can say Platform as a service (PaaS) automates the configuration, deployment and ongoing management of applications in the cloud.

iii. Software as a Service (SaaS). (4 marks)

SaaS (Software as a Service) - Software as a Service, SaaS is a software delivery method that provides access to software and its functions remotely as a Web-based service. for example Google Apps, Microsoft Office 365.

- a) **Give two examples of well-known:**

i. IaaS. (2 marks)

DigitalOcean. Linode.Rackspace.Amazon Web Services (AWS)

ii. PaaS. (2 marks)

Examples are: AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos.

iii. SaaS. (2 marks)

Examples: Google Apps, Microsoft Office 365.

Question four

a)

The `describe()` method computes and displays summary statistics for a Python data frame. The image below displays the information that the `describe` method returns when run on `data`.

```
In [1]: import pandas as pd
```

```
In [2]: file_path = "H:/PROJECTS/academic/Aureri/python/cell_samples.csv"
data = pd.read_csv(file_path)
data.describe()
```

Out[2]:

[illegible]

b)

```
In [9]: # write 3 lines of code
# CODE START HERE
import pandas as pd
import matplotlib.pyplot as plt

# CODE END HERE
import pylab as pl
import scipy.optimize as opt
from sklearn import preprocessing
from sklearn.model_selection import train_test_split
%matplotlib inline
```

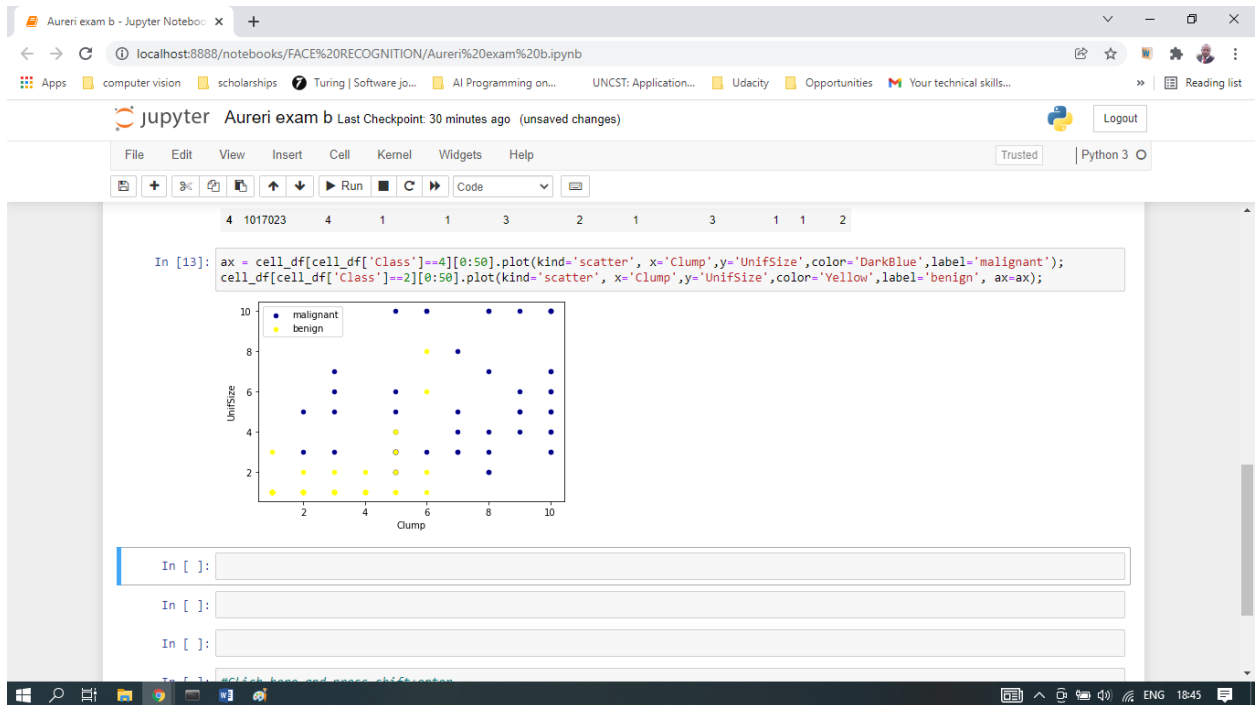
```
In [11]: cell_df = pd.read_csv("cell_samples.csv")
         cell_df.head()
```

Out[11]:

	ID	Clump	UnifSize	UnifShape	MargAdh	SingEpiSize	BareNuc	BlandChrom	NormNucI	Mit	Class
0	1000025	5	1	1	1	2	1	3	1	1	2
1	1002945	5	4	4	5	7	10	3	2	1	2
2	1015425	3	1	1	1	2	2	3	1	1	2
3	1016277	6	8	8	1	3	4	3	7	1	2
4	1017023	4	1	1	3	2	1	3	1	1	2

In []:

c)



Question Six

Study the journal by M. Shabbir et al. (2021), “Enhancing Security of Health Information Using Modular Encryption Standard in Mobile Cloud Computing”. IEEE Access

2021. The file can be downloaded from the following URL:

<https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=9316223>

Thus use it to answer questions (a) – (d)

a) **Formulate the research question of this journal.**

In reference to the journal, the following are the questions used to guide the journal

How can a layered security modeling approach be applied toward Health Information security and what are the significant consequences of this?

b) **Describe the mobile cloud computing aspect of the research.**

The mobile computing aspects of the research include

Security practices for the prevention of security breaches and vulnerabilities. is deliberated on to provide requirement-oriented health information security using the Modular Encryption Standard based on the layered modeling of the security measures.

According to the journal, The performance analysis shows that the proposed work excels, compared to other commonly used algorithms against the health information security at the mobile cloud computing environment in terms of better performance and auxiliary qualitative security ensuring measures.

Privacy is another aspect healthy information systems on cloud computing environment

c) **Outline the**

i. **Research findings.**

The research findings show that currently, the mobile cloud computing is intended for the enciphering and deciphering of textual data and there is no consideration of the image-oriented data-set yet. However, in future work, this issue would be considered.

Secondly, layered modeling may sometimes result in lowering system efficiency.

Accordingly, the efficiency of the proposed work can be further improved by the integration of quantum computing to make it more adaptable for mobile and smart devices. In the future, we may ensure patient privacy using the block chain security model.

Comparative results show that this scheme outperforms other commonly used techniques (from different performance factors) in the Mobile cloud computing environment.

ii. **Research contributions.**

The research justifies the application and usefulness of Mobile Cloud Computing in healthcare, though its growth is being hindered by privacy and security challenges. Such issues require the

utmost urgent attention to realize its full scale and efficient usage. There is a need to secure Health Information worldwide, regionally, and locally. To fully avail of the health services, it is crucial to put in place the demanded security practices for the prevention of security breaches and vulnerabilities.

d) Identify any future work in this research.

In future the issue of Mobile cloud computing would be considered. Secondly, layered modeling may sometimes result in lowering system efficiency. Accordingly, the efficiency of the proposed work can be further improved by the integration of quantum computing to make it more adaptable for mobile and smart devices. In the future, there may be need to ensure patient privacy using the block chain security model.