Network Security

Assignment: Application Layer

First Question: Intrusion Detection System IDS (25 Points)

Given the dataset with this assignment which has different training features. Your goal is to develop a machine learning-based anomaly detection for the given dataset. A support vector machine is required to be used for training the modal.

In order to import the required libraries, include the commands below.

```
import pandas as pd
from sklearn.metrics import confusion_matrix
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
```

Create the 80/20 training-test split on the independent variables. Also, drop the dependent attribute "ID, Class".

```
Independent Values = dataset["Class"]
Dependent Values = dataset.drop(["ID","Class"])
```

Goal

Your goal is to produce a Python3 script called `accuracy.py`. The script will print out the confusion matrix for both training and test datasets in order to obtain detection accuracy for the SVM supervised algorithm.

We expect the following output.

```
True Negatives : Value
False Positives : Value
False Negatives : Value
True Positives : Value
```

Submission Instructions

Your script should run on the given dataset. After completing the assignment you should only submit the resulting script.

Second Question: Intrusion Prevention System IPS (15 Points)

You are the network security engineer of a new startup. You are in charge of setting security permissions. Your goal is to develop a control system to prevent the employees from accessing undesirable websites during work. URL filtering will enforce only acceptable categories from the content-type header from the HTTP request.

The restricted URL extensions will be as mentioned below.

```
Restrict = [".pptx", ".ppt", ".xls", ".xlsx", ".xml", ".xlt", ".pdf", ".jpg",
".jpg",".svg", ".doc", ".docx", ".pps"]
```

Goal

Your goal is to produce a Python3 script called `urlFiltering.py`. which accepts two arguments. The first argument should be the list of restrictions for blocked file extensions. The second argument must accept the list of websites in order to filter them out.

We expect the following output.

```
http://www.abc.com/file : Access Denied
http://www.abc.com: Access Accepted
```

Submission Instructions

Your script should run on the given `Restrict` list. After completing the assignment you should only submit the resulting script.

Third Question: SMTP Client (30 Points)

For this assignment, you have to develop a simple SMTP client to send emails with an attachment. This SMTP client component must use Gmail accounts in exchanging emails.

We expect the following steps.

1. Setting inputs for subject and body of the email
2. Creating SMTP session
3. Setting authentication for sender's email and password
4. Adding a dynamic attachment to be sent
5. Adding dynamic receiver's email

Goal

Your goal is to produce a Python3 script called `SMTP.py`.which accepts four arguments. The first argument for sender's email, the second one for receiver's email, the third argument for adding an attachment, and the last one for adding a body for the email.

We expect the following output.

```
From: X
To: Y
Subject: New E-mail
Body: Hello
Attachment: file
```

Submission Instructions

After completing the assignment you should only submit the resulting script.

Fourth Question: Honeypot (30 Points)

You are the network security engineer of a new startup. You are in charge of setting security permissions. Your goal is to develop a honeypot component as a proactive measure to detect intruders.

We expect the following steps.

1. Setting dynamic values for IP, port, and message
2. Opening a listener
3. Showing the message when a device connects to the same IP, port
4. Logging connecting device's details

Goal

Your goal is to produce a Python3 script called `honeypot.py`.which accepts three arguments. The first argument for IP, the second one for port, and the last one for the message.

We expect the following output.

```
Log File
Time: X
IP: Y
Port: Z
Message: M
Data: 2048 bytes of data from the connected device's details.
```

Submission Instructions

After completing the assignment you should only submit the resulting script.

Make sure your assignment conforms to the in- and output described in the Goal subsection. Your assignment is partly graded through an automated system. Any deviations from the described in- and output can effect your grade.