STA 3180 Statistical Modelling: Data Security

STA 3180 Statistical Modelling - Data Security Lecture Notes

Data security is an important concept to understand when dealing with statistical modelling. It is essential to protect the data from unauthorized access, manipulation, and destruction. In this lecture, we will discuss the different types of data security, the importance of data security, and how to implement it in your own projects.

Types of Data Security

There are three main types of data security: physical security, logical security, and administrative security.

Physical Security involves protecting the physical components of a system, such as the hardware, cables, and other equipment. This includes things like locks, alarms, and surveillance cameras.

Logical Security involves protecting the data itself. This includes things like encryption, authentication, and access control.

Administrative Security involves having policies and procedures in place to ensure that data is protected. This includes things like user training, data backup, and incident response plans.

Importance of Data Security

Data security is important for many reasons. It helps protect sensitive information from being accessed or manipulated by unauthorized users. It also helps ensure that data is accurate and reliable. Finally, it helps protect the privacy of individuals whose data is being used.

Implementing Data Security

When implementing data security, there are several steps you should take. First, you should identify the data that needs to be protected and determine the level of protection it requires. Next, you should create policies and procedures to ensure that the data is secure. This includes things like user training, access control, and data backup. Finally, you should implement the necessary security measures, such as encryption and authentication.

Coding Example

```
Start of Code

//This code example shows how to encrypt a file using AES-256 encryption

import java.io.FileInputStream;
import java.io.FileOutputStream;
import javax.crypto.Cipher;
import javax.crypto.spec.SecretKeySpec;
```

```java
public class EncryptFile {
        public static void main(String[] args) throws Exception {
                // Get the file to be encrypted
                FileInputStream inFile = new FileInputStream("file.txt");
                // Get the key
                byte[] key = "abcdefghijklmnop".getBytes();
                SecretKeySpec secretKey = new SecretKeySpec(key, "AES");
                // Create the cipher
                Cipher cipher = Cipher.getInstance("AES");
                cipher.init(Cipher.ENCRYPT_MODE, secretKey);
                // Encrypt the file
                byte[] input = new byte[64];
                int bytesRead;
                while ((bytesRead = inFile.read(input)) != -1) {
                        byte[] output = cipher.update(input, 0, bytesRead);
                        if (output != null) {
                                FileOutputStream outFile = new
                                FileOutputStream("file.enc");
                                outFile.write(output);
                        }
                }
                byte[] output = cipher.doFinal();
                if (output != null) {
                        FileOutputStream outFile = new
                        FileOutputStream("file.enc");
                        outFile.write(output);
                }
                inFile.close();
        }
}
End of Code
```

Practice Multiple Choice Questions

Q1. What type of data security involves protecting the physical components of a system?

A. Physical security

B. Logical security

C. Administrative security

D. All of the above

Answer: A. Physical security