Report lab1

Subject

Trnag giới thiệu

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# **TEACHER’S COMMMENTS**

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# **WORK DISTRIBUTION**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Tran Hoang Phuc  (Leader) | Le Ba Nhat Long | Nguyen Viet Hoang | Le Anh Duy | Nguyen Hung Tuan |
| Problem statement |  |  |  |  |  |
| Build the report template |  |  |  |  |  |
| Do all exercise with Excel |  |  |  |  |  |
| Do all exercise with R |  |  |  |  |  |
| Do all exercise with Python |  |  |  |  |  |
| Summarize and edit reports |  |  |  |  |  |
| Completion(%) | 100% | 100% | 100% | 100% | 100% |

# **MEANING OF VALUES**

# **A. GDP OF VIETNAM**

## **1.USING MS EXCEL, R AND PYTHON PROGRAMMING LANGUAGE:**

### **1.1 Analyzing by using Excel**

### **1.2 Analyzing by using R**

### **1.3 Analyzing by using Python**

## **2. DATA VISUALIZATION**

### **2.1 Using Excel**

### **2.2 Using R**

### **2.3 Using Python**

# **B. COMPUTER REPAIR TIMES**

## **1.USING MS EXCEL, R AND PYTHON PROGRAMMING LANGUAGE:**

### **1.1 Analyzing by using Excel**

### **1.2 Analyzing by using R**

### **1.3 Analyzing by using Python**

## **2. DATA VISUALIZATION**

### **2.1 Using Excel**

### **2.2 Using R**

### **2.3 Using Python**

# **C. COLLEGES AND UNIVERSITIES**

## **1.USING MS EXCEL, R AND PYTHON PROGRAMMING LANGUAGE IN EXAMPLE 4.21**

### **1.1 Analyzing by using Excel**

### **1.2.1 Analyzing by using R**

**1.2 Statistical Description:**

Import data and store data



Data after import

Ảnh có chứa văn bản, số, ảnh chụp màn hình, Phông chữ

Mô tả được tạo tự động

Attach database to R search path



### **1.2.2 Meaning of values**

* The Correlation between Median SAT & Graduation:



* **The Covariance between Median SAT & Graduation**

****

### **1.3 Analyzing by using Python**

## **2. MEANING OF CORRELATION AND COVARIANCE COEFFICIENTS IN EXAMPLE 4.22**

### **2.1 Analyzing by using Excel**

### **2.2 Analyzing by using R**

Import data and store data



Data after import

Ảnh có chứa văn bản, số, ảnh chụp màn hình, Phông chữ

Mô tả được tạo tự động

Attach database to R search path



**2.2.2. Meaning of values:**

Convert the values before calculating:





Calculating the values:







Ảnh có chứa văn bản, Phông chữ, ảnh chụp màn hình, hàng

Mô tả được tạo tự động



Ảnh có chứa văn bản, ảnh chụp màn hình, Phông chữ

Mô tả được tạo tự động Ảnh có chứa văn bản, Phông chữ, ảnh chụp màn hình, Xanh điện

Mô tả được tạo tự động

### **2.3 Analyzing by using Python**

# **D. HOME MARKET VALUE**

## **USING MS EXCEL, R AND PYTHON PROGRAMMING LANGUAGE IN EXAMPLE 4.23**

### **1.1 Analyzing by using Excel**

### **1.2 Analyzing by using R**

Import data



Data after import

Ảnh có chứa văn bản, ảnh chụp màn hình, số, Phông chữ

Mô tả được tạo tự động

Attach data to R search path



Convert value



**1.2.2. Meaning of Outliers:**

* Calculating the Quantile Q1:

**Ảnh có chứa văn bản, Phông chữ, ảnh chụp màn hình, chữ viết tay

Mô tả được tạo tự động**

* Calculating the Quantile Q3:

**Ảnh có chứa văn bản, Phông chữ, chữ viết tay, ảnh chụp màn hình

Mô tả được tạo tự động**

* **Calculating IQR**

**Ảnh có chứa văn bản, Phông chữ, chữ viết tay, màu trắng

Mô tả được tạo tự động**

* **Calculating the lower bound**

**Ảnh có chứa văn bản, Phông chữ, chữ viết tay, màu trắng

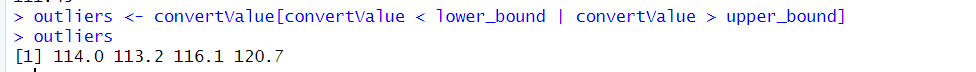
Mô tả được tạo tự động**

* **Calculating the upper bound**

**Ảnh có chứa văn bản, Phông chữ, ảnh chụp màn hình, hàng

Mô tả được tạo tự động**

* **Finding the outliers**



### **1.3 Analyzing by using Python**

# **E. STATISTICAL THINKING IN BUSINESS DECISIONS:**

## **1. DEFINITION: WHAT IS STATISTICAL THINKING IN BUSINESS DECISIONS?**

**a) What is the Statistical thinking?**

Statistical thinking is a way of understanding a complex world by describing it in relatively simple terms that nonetheless capture essential aspects of its structure or function, and that also provide us some idea of how uncertain we are about that knowledge. The foundations of statistical thinking come primarily from mathematics and statistics, but also from computer science, psychology, and other fields of study. [1]

Statistical thinking underpins our ability to navigate the complexities of data-driven decision-making and problem-solving. It emphasizes the significance of data, variability, and uncertainty in decision-making and problem-solving.

There are three major things that we can do with statistics:

* ***Describe***: The world is complex and we often need to describe it in a simplified way that we can understand.
* ***Decide:*** We often need to make decisions based on data, usually in the face of uncertainty.
* ***Predict:*** We often wish to make predictions about new situations based on our knowledge of previous situations.

Through statistical thinking, we not only identify biases but also make reliable inferences that inform our decisions. Ultimately, statistical thinking empowers us to address real-world challenges with confidence, leveraging the insights derived from rigorous statistical analysis.

"When you can measure what you are speaking about and express it in numbers, you know something about it. When you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind"

* Lord Kelvin

**b) What is the Business Decision?**

A business decision, is any choice made by a business professional that determines short-term or long-term company activities. Professionals make business decisions in response to a variety of different situations, including determining which job candidate to hire, how to distribute department budgets, when to expand into a new product market, if they should merge branches and other situations that require well-thought out actions.

Specifically, business decisions are made at various levels within an organization and across different functional areas, including:

* Operational decisions: a type of everyday business decision that company employees make on a daily basis. Operational business decisions can include a range of decisions like product inventory, customer orders or shipping needs, departmental organization, department budgets or sales and marketing initiatives.
* Strategic decisions: include any decisions that businesses make to reach a future goal. Strategic business decisions typically aim to combine a company's long-term goals with short-term goals and ideas.
* Hiring decisions: Hiring decisions reflect any business decisions related to identifying hiring needs, writing job descriptions, evaluating job candidates and determine which candidates to interview or even hire to the company.
* Financial decisions: include any business decisions that promote the financial health of a company.
* Business structure decisions: Business owners typically make business structure decisions prior to starting business operations. However, some business owners may determine they need to change their business structure after being in operation for a while.
* Business policy decisions: Business policy decisions include any decisions in reference to employee benefits, paid time off, sick leave, maternity leave, internal HR policies relating to confidentiality and other types of policies that influence customer relationships and employee welfare.
* Technology decision: Technology business decisions are those that business professionals make based on technology needs for their department or on a company-wide basis.

**c) WHAT IS STATISTICAL THINKING IN BUSINESS DECISIONS?**

Statistical thinking in business decisions is a systematic approach that harnesses data and statistical methodologies to enhance decision-making processes within organizations. It involves analyzing data to uncover insights, identifying trends and patterns, testing hypotheses, and managing uncertainties associated with data. By adopting statistical thinking, businesses can make evidence-based decisions that optimize performance, mitigate risks, and drive sustainable growth. This approach enables leaders and managers to navigate complex challenges, capitalize on opportunities, and continuously improve business outcomes.

Statistical thinking is crucial in business decision-making because it provides a structured framework for analyzing data, identifying patterns, and making informed choices. By employing statistical methods, businesses can gain deeper insights into market trends, customer behavior, and operational performance. This enables organizations to make evidence-based decisions that are grounded in data rather than intuition alone, leading to more accurate forecasts, better risk management, and improved resource allocation. Additionally, statistical thinking helps businesses to continuously monitor and evaluate their strategies and performance, fostering a culture of continuous improvement and innovation. Ultimately, statistical thinking enhances the effectiveness and efficiency of decision-making processes, driving sustainable growth and competitive advantage in today's dynamic business environment.

## **2. ILLUSTRATION EXAMPLE OF STATISTICAL THINKING IN BUSINESS DECISIONS**

***Example:*** Starbucks uses data to improve its customer experience. By analyzing data on customer purchasing habits, Starbucks can make decisions about things like which products to offer, which stores to open, and how to design its stores

* Store location

Starbucks can choose the most strategic location for its new stores by using location-based analytics powered by Atlas, a mapping and business intelligence tool developed by Esri. Before recommending a new store location, Starbucks evaluates massive amounts of data, including variables such as population, income levels, traffic, competitor presence, and proximity to other Starbucks locations. Using this information, the company can forecast revenues, profits, and other aspects of economic performance for that location

* Digital Transformation

When Starbucks launched its rewards program and mobile app, its data collection increased significantly. This allowed them to get to know their customers and extract information about their purchasing habits. Using its mobile app, Starbucks collects data about what, where, and when its members purchase coffee.

Starbucks uses the Digital Flywheel program, a cloud based artificial intelligence engine, capable of making precise food and beverage recommendations. As a result, even when people visit a new Starbucks location, the store’s point-of-sale system can identify the customer through their phone and give the barista their preferred order.

Starbucks could also suggest new products a customer might like based on their purchase history, as well as provide unique discounts and rewards on specific items based on their unique preferences.

Starbucks went one step further by collecting data on weather patterns and their relationship with customer order patterns.

* Product management

Starbucks used the gathered data to determine which products to offer when launching new products. In particular, when expanding its product lines into grocery stores, the company heavily relies on the data gathered.

According to a study, 43% of tea drinkers avoid adding sugar. Starbucks created a new product line of unsweetened iced teas to cater to this market. Also, after discovering that 25% of consumers do not add milk to their coffee, the company launched a new line of black iced coffee without milk. These menu enhancements and grocery store product launches are not only just providing customers with their favorite products. They are also about convincing their customers to avoid other coffee brands while at home.

* Overall, Starbucks' use of big data and statistical thinking underscores its commitment to data-drive mer-centricity, and continuous innovation, enabling the company to stay competitive and maintain its position as a leader in the global coffee industry.

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