FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI.

A TECHNICAL REPORT ON STUDENTS INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

DONE AT

OMNEY PAYMENT LIMITED.

WRITTEN BY:

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SUBMITTED TO:

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CERTIFICATION

This is to certify that the internship on **"Data Science"** in **"Omney Payment Limited"** was carried out by **EZEUGO PEARL UZOAMAKA** with **Reg. no: 20181090055** in the **Department of Mathematics**, Federal University Of Technology, Owerri, Imo State.

…..…… ……

(MTH SIWES Coordinator) Date

…..…… ……

(Head of Department) Date

…..…… ……

(Dean SOPS) Date

DEDICATION

I dedicate this report to God Almighty, who gave me the gift of life and made it possible for me to participate in this SIWES training. I am grateful for His guidance and blessings throughout this journey.

I also dedicate this report to my loving parents, who have always been there for me, providing me with love, care, and support. I am so grateful for their sacrifices and encouragement.

ACKNOWLEDGEMENT

I am deeply grateful, first and foremost, to God above for His love and protection. I would like to express my appreciation to my parents and siblings for their unwavering love, care, and understanding.

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ABSTRACT

This is a Student Industrial Work Experience Scheme (SIWES) report done at Omney Payment Limited, Imo State, Nigeria. It provides a detailed summary of the History of SIWES, Profile of the company, Internship Experience gained, Project carried out during internship as well Challenges encountered and Recommendations.

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CHAPTER ONE

STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (S.I.W.E.S)

1.1 INTRODUCTION

The Students Industrial Work Experience Scheme (SIWES) is a skill training program designed to expose and prepare students of Universities, Polytechnics/Colleges of Technology, Colleges of Agriculture and Colleges of Education for the industrial work situation they are likely to meet after graduation.

It is an effort to bridge the existing gap between theory and practice of Engineering and Technology, sciences, agriculture, medical, management, and other professional educational field exposing students to machines and equipment, professional work methods and ways of safe-guarding the work areas and workers in industries and other organizations. The scheme also affords students the opportunity of familiarizing and exposing themselves to the needed experience in handling equipment and machinery that are usually not available in their institutions. It is a cooperative industrial internship program that involves institutions of higher industries, the Federal Government of Nigeria, Industrial Training Fund (ITF), and Nigerian Universities Commission (NUC).

1.2 BRIEF HISTORY OF SIWES

The early phase of science and technology in Nigeria was characterized by theoretical lectures in polytechnics and universities which have proven to be an ill method of teaching. Students in Universities and Polytechnics graduate with little or no technical experience in their course of study. In the same vein students' inability to contribute to the society is hampering the growth and development of our country. It was in this view that SIWES was introduced to the Industrial and Educational sector. Economists being able to evaluate the role technology plays in a country's economy to grow and develop there be advancement in the technology sector of the country.

SIWES was established in the year 1973 in order to improve the standard of education in Nigeria in order to improve the standard of education in Nigeria in order to achieve the needed technological advancement. It commenced in 1974 with 748 students from 11 institutions. By 1978 it grew to 32 institutions with 4,713 students (for courses in Engineering and Technology disciplines in Universities, Polytechnics and Colleges of Technology). SIWES was solely funded by ITF (Industrial Training Funds (ITF) and the Federal Government. The financial involvement became unbearable to the ITF; hence ITF withdrew support for Polytechnics and Colleges of Technology. In 1979, Federal Ministry of Education made it compulsory for all students of Polytechnics, Colleges of Technology to undergo a One-year IT program. Even then the commitment was still too much that by January 1980, ITF withdrew from financing SIWES. In 1979-1984, Federal Government used NUC and NBTE to fund to scheme. The effective management of Student's Industrial Work Experience Scheme (SIWES) has been as a result of the cooperation and well-played roles of

the Federal Government, ITF, and supervising agencies. Here are the roles played by the managements of this scheme.

1.3 THE OBJECTIVES OF SIWES

- The Industrial Training Fund document which established SIWES outlined some of its objectives which are to provide students with the opportunities to apply their educational knowledge in real work situation, thereby bridging the gap between theory and practice.
- Expose students to work methods and techniques in handling equipment and machinery that may not be available in their institutions.
- Make the transition from school to the world of work easier and enhance students' contacts for later job placements.
- It provides an avenue for students in Nigerian tertiary institutions to acquire industrial skills and experience in their course of study.

1.4 IMPORTANCE OF SIWES

- It provides students with an opportunity to apply their theoretical knowledge in real life situation
- It exposes students to more practical work, methods and techniques.

- It strengthens links between employers, universities and industrial training fund (ITF).

1.5 ROLES OF THE DIFFERENT BODIES INVOLVED IN THE MANAGEMENT OF SIWES

The different bodies involved in the management of SIWES have their different roles they play to make the scheme successful.

1.5.1 ROLES OF THE GOVERNMENT

Federal Government being the major party in the establishment of SIWES; has ever since been involved in the management of SIWES. Some of the roles played are:

- To make it mandatory for all ministries, and companies to offer places of attachments for students in accordance with the provision decree of No 47 of 1971 as amended in 1990.
- To provide necessary and adequate funds to ITF through the Federal ministries of industries.
- Make it a policy to include a clause in every major contract lasting over six to nine months being awarded for contractors to take student on attachment.

1.5.2 ROLES OF THE INDUSTRIAL TRAINING FUND (ITF)

Roles performed by ITF (Industrial Training Fund) in SIWES includes:

- Provide logistics and materials needed to administer the scheme.
- Supervise students through its Area offices.
- Organize biennial conference and seminars on SIWES

- Compile lists of employers and available training places for industrial attachment and forward such lists to the coordinating agencies (i.e. NUC, NBTE, AND NCCE)

1.5.3 ROLES OF THE NATIONAL UNIVERSITIES COMMISSION

Roles performed by the coordinating agency (NUC) are:

- In collaboration with ITF, compile lists of employers for institution's placements lists.
- Establish SIWES coordinating units in higher institutions.
- Evolve a minimum national guide program for supervised industrial training activities for approved SIWES courses.
- Appoint full time industrial coordinators to operate the scheme at agency level.
- Vet and approve SIWES master and placement list and forward to ITF.

1.5.4 ROLE OF THE STUDENT AND THE INSTITUTION

The role of the students as regards SIWES is to comply with the rules and regulations of the employers. Students are required to arrange their own accommodation during the period of attachment. Be punctual and regular at respective place of attachment.

1.5.5 ROLES OF THE INSTITUTION

- Prepare and submit master and placement lists to the respective coordinating agency and also place students on attachment with employers.
- Appoint full-time industrial coordinators to operate the scheme at industrial level.
- Organize orientation programs for students to prepare them for industrial training. ITF representative may be invited to give a talk to the student during the orientation program.

CHAPTER TWO

OVERVIEW OF ORGANIZATION

2.1 BRIEF HISTORY OF THE ORGANIZATION

In the heart of the bustling Fintech industry, a company emerged, poised to reshape the digital financial landscape. Omney Payment Limited, a name that would soon resonate across the financial world, was born from the collective ambition of visionaries who saw the potential of technology to revolutionize the way we handle money.

2.2 SETTING THE STAGE

Nestled in the heart of a vibrant metropolis, Omney Payment Limited had its headquarters in a sleek, glass-walled skyscraper that stood as a testament to modernity. The company's offices were a hive of activity, where software developers huddled in dimly lit rooms, writing lines of code that would power the financial systems of tomorrow.

2.2.1 A FINTECH POWERHOUSE

Omney Payment Limited was not just another Fintech company; it was a powerhouse. Its core strengths lay in two primary areas: software development and Fintech operations. The former, a team of brilliant minds, meticulously crafted the digital infrastructure that would support the company's financial products. They were the architects of innovation, laying the foundation for the future of digital finance.

2.2.2 MAJOR PRODUCTS

Omney Payment Limited product portfolio included two key pillars: Debit cards and Payment gateways.

The debit cards they issued were not just pieces of plastic; they were keys to a new financial realm. These cards seamlessly merged the digital and physical worlds, allowing users to access their funds with unprecedented ease.

The payment gateways developed by Omney Payment Limited were the lifeblood of e-commerce and online transactions. They ensured that the wheels of digital commerce turned smoothly, securely processing millions of transactions every day. It was these gateways that made online shopping a breeze and facilitated the global movement of funds.

2.2.3 THE PROMISE OF A NEW ERA

Chapter two of Omney Payment Limited story was marked by ambition, innovation, and the promise of a new era in finance. As the company's reputation grew, so did its influence on the Fintech landscape. But with power came responsibility, and as Omney Payment Limited set out to change the way the world handled money, it would face challenges and dilemmas that would test its mettle.

2.2 VISION

To enable every Nigerian save and spend from wherever they are, whenever they want and in whatever format their money might be in. They also help young minds to polish their computer skills.

CHAPTER THREE

AN OVERVIEW OF DATA SCIENCE

3.1 DEFINITION OF DATA SCIENCE

Data science combines math and statistics, specialized programming, advanced analytic, artificial intelligence (AI), and machine learning with specific subject matter expertise to uncover actionable insights hidden in an organization's data. These insights can be used to guide decision making and strategic planning.

3.1.1 DATA SCIENCE TOOLS

- MySQL
- Excel
- Python
- Tableau
- Power BI

3.1.2 MATH AND DATA SCIENCE

Mathematics is an integral part of data science. Any practicing data scientist or person interested in building a career in data science will need to have a strong background in specific mathematical fields.

Data science careers require mathematical study because machine learning algorithms, and performing analyses and discovering insights from data require math. While math will not be the only requirement for your

educational and career path in data science, but it's often one of the most important.

3.1.3 SOME MATHS SKILLS NEEEDED IN DATA SCIENCE

- **LINEAR ALGEBRA**

Knowing how to build linear equations is a critical component of machine learning algorithm development. You will use these to examine and observe data sets. For machine learning, linear algebra is used in loss functions, regularization, co-variance matrices, and support vector machine classification.

- **STATISTICS AND PROBABILITY**

Probability is critical for hypothesis testing and distributions such as Gaussian distribution and probability density function. Data scientists use statistics to gather, review, analyze, and draw conclusions from data, as well as apply quantified mathematical models to appropriate variables.

- **CALCULUS**

Calculus is used in optimization and modeling. For instance, Gradient descent and its variants are used to optimize machine learning algorithms. Calculus helps in finding the maximum likelihood estimates in statistical modeling. Integration is used in probability density functions and cumulative distribution functions.

- **OPTIMIZATION**

Optimization techniques are crucial for tuning machine learning models, selecting parameters, and solving complex problems efficiently. It is a fundamental tool in data science for solving a wide range of problems,

from training machine learning models to making data-driven decisions. It allows data scientists to find the best solutions, make predictions, and optimize processes in various domains.It provides the mathematical framework and techniques for finding the best solution among a set of possible choices.

- **NUMERICAL ANALYSIS**

Numerical analysis is used for solving numerical problems that arise in data science, such as : Solving equations and systems of equations, Handling numerical stability issues in algorithms and calculations, Approximating solutions to complex mathematical problems.

- **DIFFERENTIAL EQUATIONS**

Differential equations are used in modeling dynamic systems and processes that change over time, such as time series analysis and physics-based simulations. They are a powerful mathematical tool in data science, enabling the modeling, analysis, and prediction of various real-world phenomena and processes. Their versatility and applicability make them a valuable asset for data scientists working on a wide range of problems.

3.2 RELEVANCE OF MATHEMATICS TO DATA SCIENCE

Math is an important part of data science. It can help you solve problems, optimize model performance, and interpret complex data that answer business questions. Mathematics provides the theoretical framework and tools necessary to understand, analyze, and manipulate data in data science. It enables data scientists to develop algorithms, build models, make predictions, and extract valuable insights from data. A strong foundation in mathematics is essential for anyone working in the field of data science.

3.3 DIFFERENCE BETWEEN DATA SCIENCE AND DATA ANALYSIS

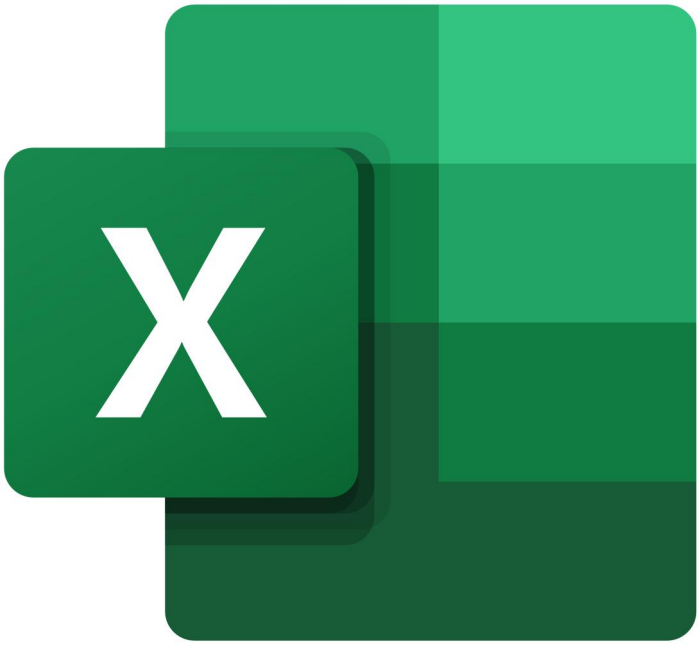
While data analysis and data science both deal with data, data analysis tends to focus on descriptive and retrospective tasks, while data science encompasses a wider range of activities, including predictive modeling and the development of data-driven applications with a future-oriented perspective. Data scientists often have a more comprehensive skill set and play a strategic role in organizations compared to data analysts.

CHAPTER FOUR

INTRODUCTION TO DATA SCIENCE TOOLS

4.1 INTRODUCTION TO EXCEL

Microsoft Excel is a spreadsheet editor developed by Microsoft for Windows, MacOS, Android, iOS and iPadOS. It features calculation or computation capabilities, graphing tools and, pivot tables.



4.1.1 HOW EXCEL IS USEFUL IN DATA SCIENCE

Excel Spreadsheets helps developers to build the foundational structure on data as it helps to understand the analytical approach to gain insights from it. Using of Excel is restricted to entry-scale data products, where it can provide basic visualizations and accurate results on the given data. Excel helps to solve many of the data science problems in various industries like Automotive, Health Care, Retail, Financial Industries and so on. Excel is used in developing simple level applications

recommendations, fraud detections etc., to the complex level applications like building Self Driving Cars. It is recognized as the most powerful tool of Data Science.

4.1.2 BASIC FUNCTIONS IN EXCEL

- SUM: Adds up a range of numbers. For example, =SUM(A1:A10) will add the values in cells A1 through A10.

- AVERAGE: Calculates the average of a range of numbers. For example, =AVERAGE(B1:B5) will compute the average of values in cells B1 through B5.

- MAX: Returns the largest value in a range. For example, =MAX(C1:C20) will find the maximum value in cells C1 through C20.

- MIN: Returns the smallest value in a range. For example, =MIN(D1:D15) will find the minimum value in cells D1 through D15.

- COUNT: Counts the number of cells in a range that contain numbers. For example, =COUNT(E1:E30) will count how many cells in the range E1 through E30 contain numbers.

- IF: Allows you to perform conditional operations. It returns one value if a condition is true and another value if it's false. For example, =IF(A1>10, "Yes", "No") will return "Yes" if the value in A1 is greater than 10, otherwise "No."

- COUNTIF: Counts the number of cells in a range that meet a specific condition. For example, =COUNTIF(F1:F10, ">50") will count how many cells in the range F1 through F10 are greater than 50.

4.2 INTRODUCTION TO MySQL

MySQL is an open-source relational database management system (RDBMS). A relational database organizes data into one or more data tables in which data may be related to each other; these relations help structure the data. SQL is a language that programmers use to create, modify and extract data from the relational database, as well as control user access to the database. In addition to relational databases and SQL, an RDBMS like MySQL works with an operating system to implement a relational database in a computer's storage system, manages users, allows for network access and facilitates testing database integrity and creation of backups.

4.2.1 HOW IS MYSQL USEFUL IN DATA SCIENCE

In today's data-driven world, SQL has become an essential tool for data scientists. It helps data scientists access, manage, and analyze large data sets to derive insights that can drive better business decisions.

Professionals looking to build a career in data science, learning SQL is a must-have skill. Some of the importance of MySQL are written below:

- Data Storage and Management: MySQL allows data scientists to store and manage large volumes of structured data efficiently. Data can be organized into tables and relational databases, making it easier to access and manipulate.

- Data Retrieval: Data scientists can use SQL (Structured Query Language) to retrieve data from MySQL databases. SQL is a powerful language for querying databases, and it enables data scientists to extract specific subsets of data for analysis.

- Data Pre-Processing: Before performing data analysis, data often needs to be cleaned, transformed, and Pre-Processed. MySQL can be used to filter, aggregate, and reshape data, preparing it for analysis.

- Data Integration: MySQL can serve as a central repository for data from various sources. Data scientists can integrate data from different databases, systems, or sources into MySQL, creating a unified and consistent dataset for analysis.

- Data Exploration: MySQL can be used for exploratory data analysis (EDA). Data scientists can write SQL queries to examine data distributions, summary statistics, and relationships between variables, which is essential for understanding the dataset.

- Data Joining: When dealing with multiple related datasets, data scientists can use SQL JOIN operations to combine data from different

tables. This is particularly useful when working with normalized databases.

- Data Filtering and Subsetting: SQL provides powerful filtering capabilities, allowing data scientists to select rows and columns based on specific criteria. This is crucial for creating subsets of data for focused analysis.

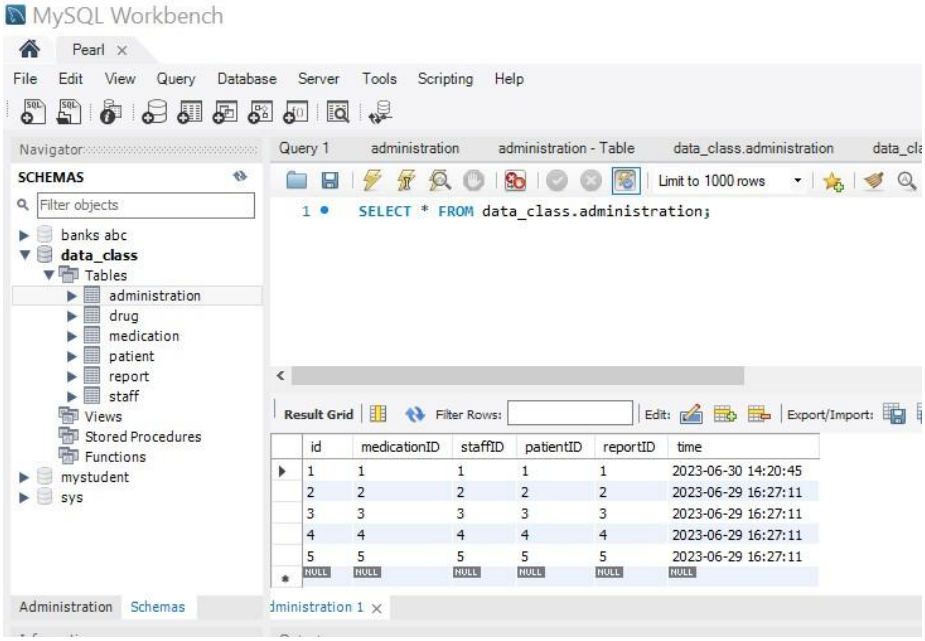
- Aggregation and Summary Statistics: MySQL supports aggregation functions like SUM, AVG, COUNT, and more. Data scientists can use these functions to compute summary statistics and generate aggregated reports.

- Data Visualization: While MySQL itself doesn't provide data visualization capabilities, data scientists can retrieve data from MySQL databases and then use data visualization tools like Python libraries.

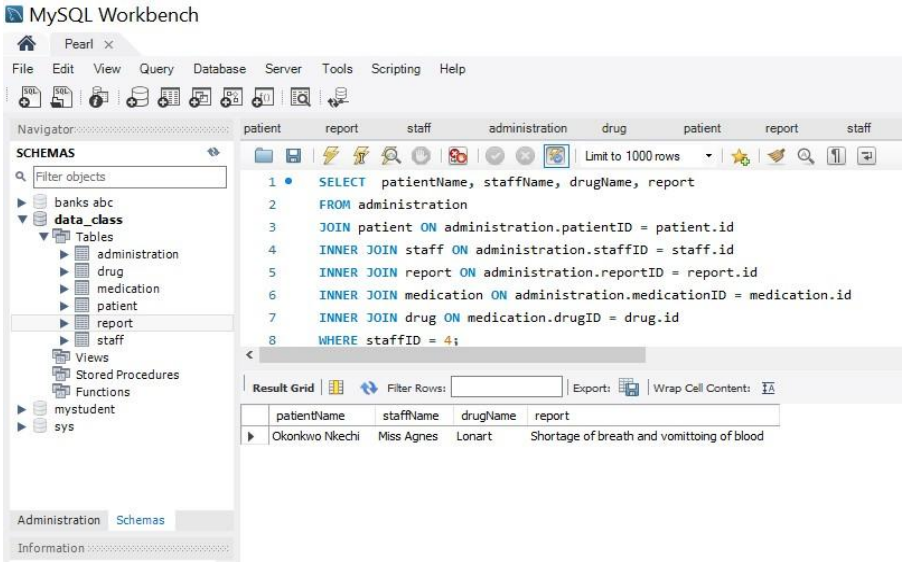
- Data Export: MySQL allows data scientists to export query results into various formats, such as CSV or Excel, making it easy to share and analyze data using other tools.

4.2.2 A SAMPLE CASE STUDY OF A HOSPITAL ADMINISTRATIVE SYSTEM

QUESTION: Which staff with id of 4 administered drug

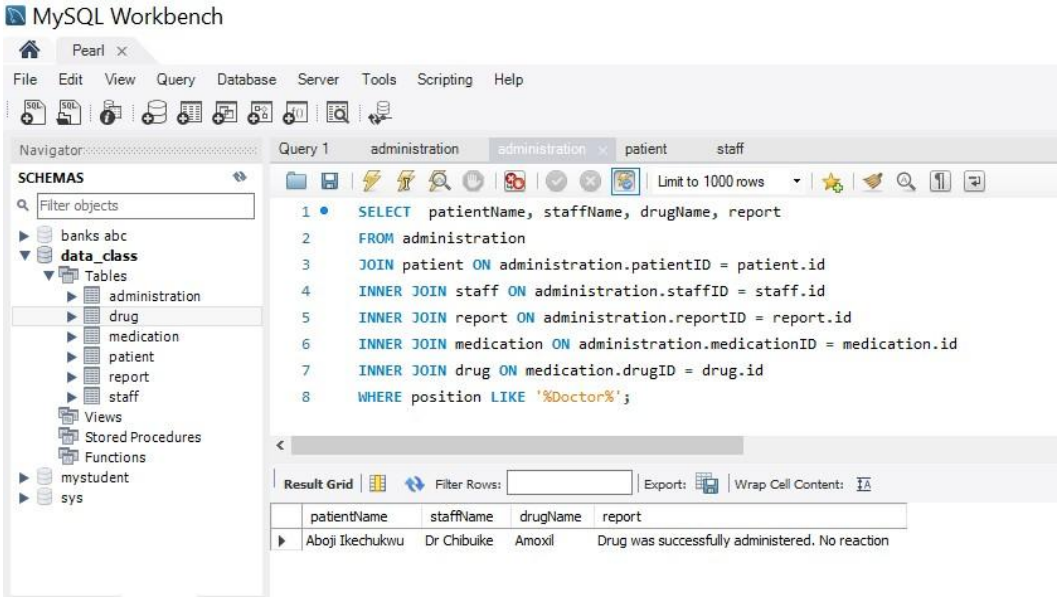


RESULT:



QUESTION 2:

Use the above hospital administrative system to answer the question, which doctor administered drug without reaction.



4.2.3 TRIGGERS IN MYSQL

A MySQL trigger is a database object that is associated with a table. It will be activated when a defined action is executed for the table.

The trigger can be executed when you run one of the following MySQL statements on the table: INSERT, UPDATE and DELETE and it can be invoked before or after the event. The different types of triggers in MySQL are;

- INSERT UPDATE
- AFTER UPDATE
- BEFORE DELETE
- AFTER DELETE
- BEFORE INSERT
- AFTER INSERT

Example;

Considering tables:

```
Create table customer (acc_no integer primary key,
                       cust_name varchar(20),
                       avail_balance decimal);
Create table mini_statement (acc_no integer,
                             avail_balance decimal,
                    foreign key(acc_no) references customer(acc_no) on delete cascade);
```

Inserting values in them:

```
insert into customer values (1000, "Fanny", 7000);
insert into customer values (1001, "Peter", 12000);
```

Trigger to insert (old) values into a mini_statement record (including account number and available balance as parameters) before updating any record in customer record/table:

```
delimiter //
create trigger update_cus
    -> before update on customer
    -> for each row
    -> begin
    -> insert into mini_statement values (old.acc_no, old.avail_balance);
  end; //
```

Making updates to invoke trigger:

```
delimiter;
update customer set avail_balance = avail_balance + 3000 where acc_no = 1001;
update customer set avail_balance = avail_balance + 3000 where acc_no = 1000;
```

Output:

```
select *from mini_statement;
+--------+--------------+
| acc_no | avail_balance |
+--------+--------------+
|   1001 |         12000 |
|   1000 |          7000 |
+--------+--------------+
2 rows in set (0.0007 sec)
```

4.3 INTRODUCTION TO PYTHON

Python is a high-level, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation.Python is dynamically typed and garbage-collected. It supports multiple programming models, including structured (particularly procedural), object-oriented and functional programming. It is often described as a "batteries included" language due to its comprehensive standard library.

4.3.1 BASIC FUNCTIONS IN PYTHON

- print(): Used to display output to the console. For example:
  print("Hello, world!")
- input(): Reads input from the user via the console. For example:
  name = input("Enter your name: ")
- int(), float(), str(): Convert values to integers, floats, or strings, respectively.
  For example:
  ```
  x = "5"
  y = int(x)  # Converts the string "5" to an integer 5
  ```
- range(): Generates a sequence of numbers.
  ```
  for i in range(5):
    print(i)  # Output: 0, 1, 2, 3, 4
  ```
- def (): keyword used to declare a function
- Conditional statements(if, else, elif): for example
  ```
  num = -5
  if num > 0:
  print("The number is positive.")
  ```

```
else:
print("The number is negative.")
```

Output: The number is negative.

- type( ) function: The type() function returns the type of the specified object.

  Example:

```
list_of_fruits = ('apple', 'banana', 'cherry', 'mango')
print(type(list_of_fruits))
```

4.3.2 PROJECT ON PYTHON

QUESTION 1: Create a calculator using basic arithmetic operations

SOLUTION 1:

```
a = int(input("Enter the first number: "))
b = int(input("Enter the second number: "))
print("Welcome ")
def addWar (a,b) :
   print("The sum is ", a+b)
def subWar (a,b) :
   print("The difference is ", a-b)
def divWar (a,b) :
   print("The coefficient is ", a/b)
def multiWar (a,b) :
   print("The product is ", a*b)
def powerWar (a,b) :
   print("The power is ", a**b)
print(multiWar(a,b))
print(divWar(a,b))
print(addWar(a,b))
print(subWar(a,b))
print("Good luck")
```

RESULT:

```
Enter the first number: 60
Enter the second number: 55
Welcome
The product is  3300
None
The coefficient is  1.0909090909090908
None
The sum is  115
None
The difference is  5
None
Good luck

[Program finished]
```

QUESTION 2: Create an if else operation for the calculator above soving a specific arithmetic question.

```
a = int(input("Enter the first number: "))
b = int(input("Enter the second number: "))
print("Welcome ")
def addWar (a,b) :
    print("The sum is ", a+b)
def subWar (a,b) :
    print("The difference is ", a-b)
def divWar (a,b) :
    print("The coefficient is ", a/b)
def multiWar (a,b) :
    print("The product is ", a*b)
def powerWar (a,b) :
    print("The power is ", a**b)
op = input("Specify the operation(* or / or
+ or -):")
if(op == "*"):
    print(multiWar(a,b))
elif(op == "/"):
    print(divWar(a,b))
elif(op == "+"):
    print(addWar(a,b))
elif(op == "-"):
    print(subWar(a,b))
else:
    print("invalid operatiom")
print("Good luck")
```

RESULT:

```
Enter the first number: 44
Enter the second number: 66
Welcome
Specify the operation(* or / or + or -):"
invalid operatiom
Good luck

[Program finished]
```

CHAPTER FIVE

5.1 CHALLENGES

I was confronted with few challenges that were mainly from the poor interpersonal relationship between I and my colleagues. This was put to check via the intervention of our supervisors through discussions and meetings. At the training place, the major problems were due to the fact that the Microsoft excel an python we used were outdated. And there was a problem getting genuine version for users. One of the major points in my IT is that we were given project topics on which we were to source for materials either from internet or libraries after which we delivered a presentation and this really gave us The opportunity to learn more. I also had problems installing the MYSQL app and understanding how to make use of the key functions.

5.2 RECOMMENDATIONS

To improve on the SIWES program I have some recommendations to make to ITF, the students and the institution.

5.2.1 Industrial Training Fund (ITF)

- The months for attachment should be extended to enable students gain more experience.
- Provision of monthly stipends for students during the period of attachment, this will help reduce financial constrain.
- Compel all organization to provide place of attachment for students.

5.2.2 STUDENTS

- Students should start seeking for potential company for internship early.
- Zeal and willingness to learn should be showcased during period of internship.
- Good morals and behavior should be exhibited by students in their place of attachment.
- Students should be good ambassadors of their various institutions.

5.2.3 UNIVERSITY

- The University should try to collaborate with some industries and firms in order to get easy placement for students

5.3 CONCLUSION

The Student Industrial Work Experience Scheme is indeed a wonderful programme. It really helps students to acquire skills and experience which prepares them for a smooth transition from the university into the working environment. Indeed it was a fruitful experience.

I also learnt how to use some application that are inclined to my course of study, and the processes involved in collection, analysis and storage of data. Professional behavior is not exempted from the things I learnt during the course of my internship.

Finally, I would like to state that the SIWES programme is a very relevant and necessary programme for all students that must be taken advantage of by every student for each student's professional development prior to graduation.

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