Rust – File Input & Output

Week 9

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Reading and Writing to Files

Rust allows reading and writing to files.

The File struct represents a file.

It allows a program to perform read-write operations on a file.

All methods in the File struct return a variant of the io::Result enumeration.

Common Methods of File struct

Sr.No	Module	Method	Description
1	std::fs::File	open()	The open static method can be used to open a file in read-only mode.
2	std::fs::File	create()	Static method opens a file in write-only mode. If the file already existed, the old content is destroyed. Otherwise, a new file is created.
3	std::fs::remove_file	remove_file()	Removes a file from the filesystem. There is no guarantee that the file is immediately deleted.
4	std::fs::OpenOptions	append()	Sets the option for the append mode of file.
5	std::io::Writes	write_all()	Attempts to write an entire buffer into this write.
6	std::io::Read	read_to_string()	Reads all bytes until EOF in this source, appending them to buf.

Write to a File

Practice 1: week-9/practice_1/src/main.rs

main.rs | data.txt

```rust
use std::io::Write;

fn main() {

    let announce = "Week 9 - Rust File Input & Output\n";
    let dept = "Department of Computer Science";

    let mut file = std::fs::File::create("data.txt").expect("create failed");
    file.write_all("Welcome to Rust Programming\n"
        .as_bytes()).expect("write failed");
    file.write_all(announce.as_bytes()).expect("write failed");
    file.write_all(dept.as_bytes()).expect("write failed");
    println!("\nData written to file." );

}
```

main.rs | data.txt

```
1  Welcome to Rust Programming
2  Week 9 - Rust File Input & Output
3  Department of Computer Science
4
5
```

Read from a File

- The "open" function is used to open an existing file.
- An absolute or relative path to the file is passed to the open() function as a parameter.
- The open() function throws an exception if the file does not exist, or if it is not accessible for whatever reason. If it succeeds, a file handle to such file is assigned to the "file" variable.
- The "read_to_string" function of the "file" handle is used to read contents of that file into a string variable.

Practice 2: week-9/practice_2/src/main.rs

main.rs

```rust
use std::io::Read;

fn main(){
    let mut file = std::fs::File::open("welcome_message.txt").unwrap();
    let mut contents = String::new();
    file.read_to_string(&mut contents).unwrap();
    print!("{}", contents);
}
```

Delete a File

The code below uses the *remove_file()* function to delete a file.

The *expect()* function returns a custom message in case an error occurs.

Practice 3: week-9/practice_3/src/main.rs

main.rs

```rust
use std::fs;

fn main() {
    fs::remove_file("data.txt").expect("could not remove file");
    println!("file is removed");
}
```

Append data to a File

The *append()* function writes data to the end of the file.

Practice 4: week-9/practice_4/src/main.rs

main.rs

```rust
use std::fs::OpenOptions;
use std::io::Write;

fn main() {

    let mut file = OpenOptions::new().append(true).open("data.txt").expect(
        "cannot open file");
    file.write_all("\nHello Class".as_bytes()).expect("write failed");
    file.write_all("\nThis is the appendage to the document."
        .as_bytes()).expect("write failed");
    println!("file append success");

}
```

Class Projects

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Project I

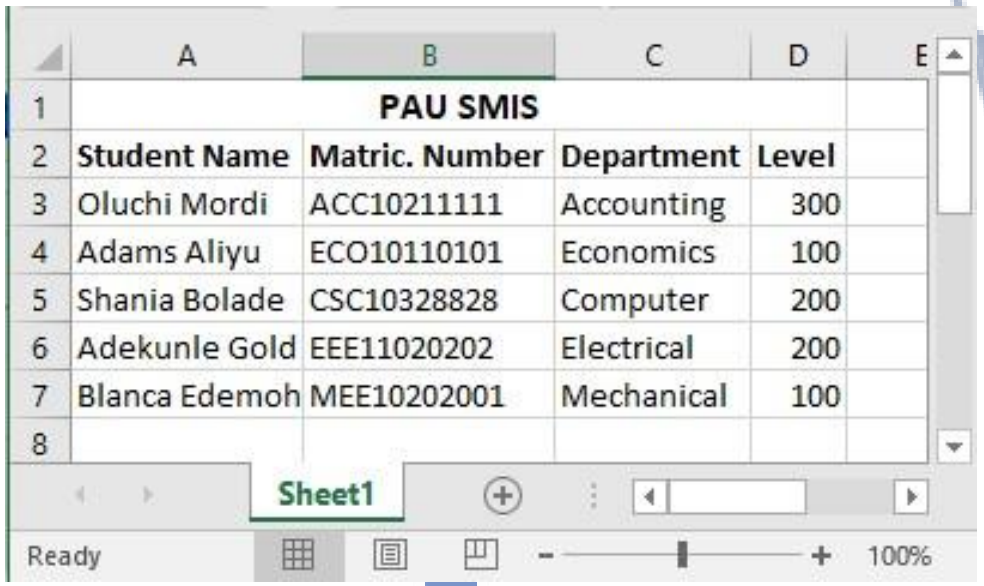
Nigerian Breweries Plc, the pioneer and largest brewing Company in Nigeria was incorporated in 1946 as "Nigerian Brewery Limited". Their rich portfolio of high-quality Lager, Stout, Non-alcoholics and Spirit are uniquely outstanding which is why they are Nigeria's number one choice, as shown below.

Lager	Stout	Non-Alcoholic
33 Export	Legend	Maltina
Desperados	Turbo King	Amstel Malta
Goldberg	Williams	Malta Gold
Gulder		Fayrouz
Heineken		
Star		

You have been hired to develop a Rust application to create a file that saves the high-quality categories of drinks, as indicated in the table.

Project II

PAU uses a “Student Management Information System” (PAU-SMIS) to manage student-related data. This system provides facilities for recording and maintaining personal details of students, maintaining marks scored in assessments and computing results of students, keeping track of student attendance, managing many other student-related data. With your high-level programming skills in Rust, develop a program that reads the personal details of the students from an array or vector, then displays the details and save into a file in the following format.



	A	B	C	D	E
1		PAU SMIS			
2	Student Name	Matric. Number	Department	Level	
3	Oluchi Mordi	ACC10211111	Accounting	300	
4	Adams Aliyu	ECO10110101	Economics	100	
5	Shania Bolade	CSC10328828	Computer	200	
6	Adekunle Gold	EEE11020202	Electrical	200	
7	Blanca Edemoh	MEE10202001	Mechanical	100	
8					

Sheet1

Ready 100%

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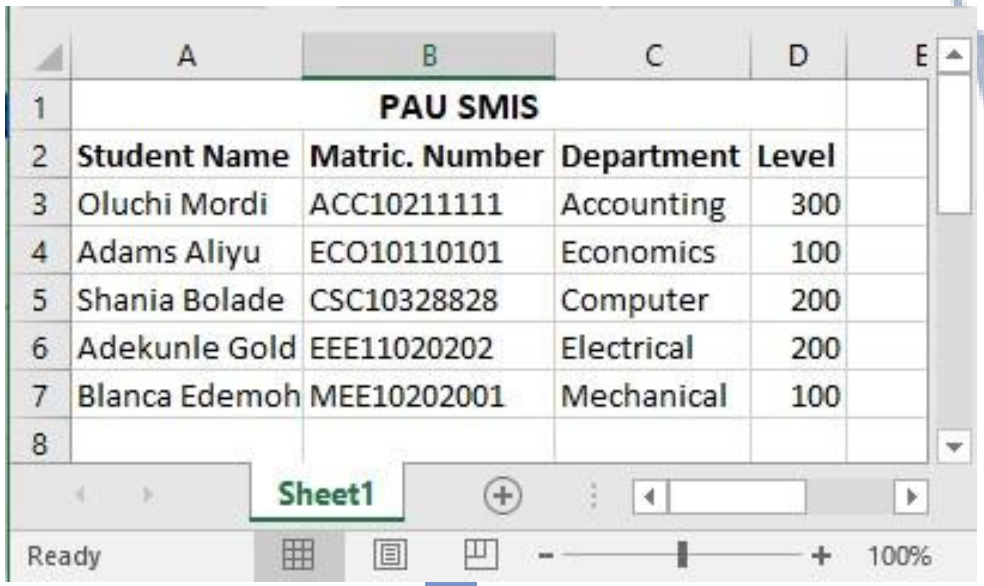

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Sheet1

Ready 100%

Project III

The Federal Government of Nigeria has tasked the EFCC to produce the files of convicted Ministers from different geopolitical zones in the country. However, due to a recent outbreak at the Information Service Department of the Abuja Headquarters, the hard copy files were lost. Nevertheless, the cloud backup system dataset are safe, but they exist in separate datasets.

As an expert developer, the EFCC has consulted you to develop a rust program that would merge these separate datasets into one single output. Should you choose to accept the task, implement the program with your knowledge of arrays and vectors.

S/N	NAME OF COMMISIONER
1	Aigbogun Alamba Daudu
2	Murtala Afeez Bendu
3	Okorocha Calistus Ogbona
4	Adewale Jimoh Akanbi
5	Osazuwa Faith Etieye

S/N	MINISTRY
1	Internal Affairs
2	Justice
3	Defense
4	Power & Steel
5	Petroleum

S/N	GEOPOLITICAL ZONE
1	South West
2	North East
3	South South
4	South West
5	South East

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