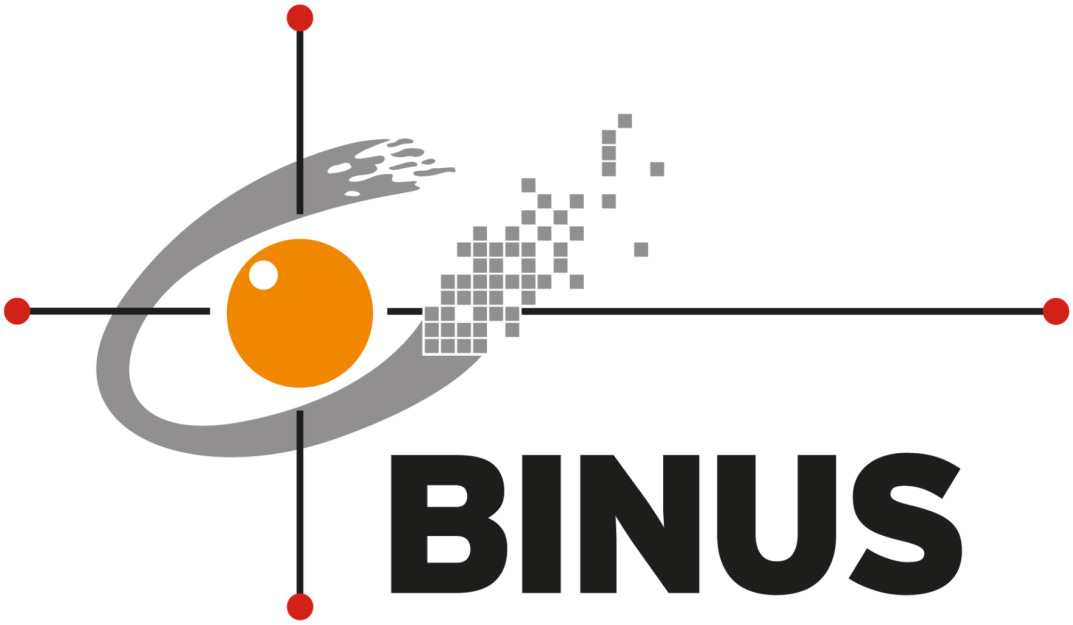
ALGORITHM AND PROGRAMMING

FINAL PROJECT

Lecturer: Jude Joseph Lamug Martinez



Andrew Tanuwijaya - 2602158216

Class L1BC

Computer Science Major

Binus International University, 2022

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=== 1. A Quick Introduction

1.1 : The Objective

The objective of the program, originally, was really simple. Have a finance tracker to match your daily spendings in one application. This way, every night, you would know where your money went and what it was spent on. It was not meant to try to rival any existing applications, just to try and see what the capabilities are.

1.2 : Directives

The planned direction was as straightforward as possible. Application Menu, Enter Data, View Data, and Edit Data. However, the uniqueness came from its GUI, as I had chosen to use pygame, or another graphical interface module. However, as the time passed, I realized there simply was not enough time to try and learn how to use these tools. Thus, I decided to opt for the basics, the Terminal. How was one to create something even remotely interesting in the black and white background of the terminal? ASCII, art from scratch. I wanted to make the most interesting and compelling screens so as not to bore the user. That is exactly what I attempted to do, and whether the user enjoys it is up to them.

1.3 Solutions

The plan did go off the rails a bit as well, not only in terms of the graphical interface, but the code as well. There were some unforeseen issues, such as me making some basic Python mistakes and slightly more advanced misunderstandings with the pandas module. However, the basic thought process was there.

Use pandas to create a database for the data entry, save it, and store it. Rinse, repeat, and you have a decently working program for an individual to store their financial data. As the data is stored locally, there is zero risk of a data leak, with the exception of the individual’s laptop being compromised. Aside from that, everything is safe.

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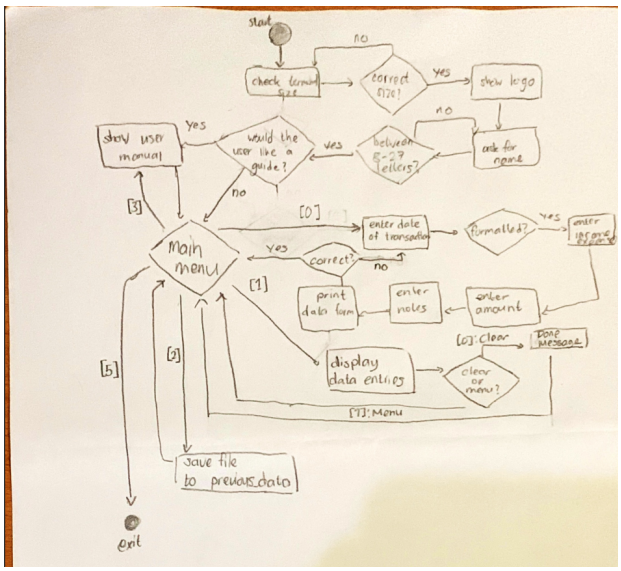
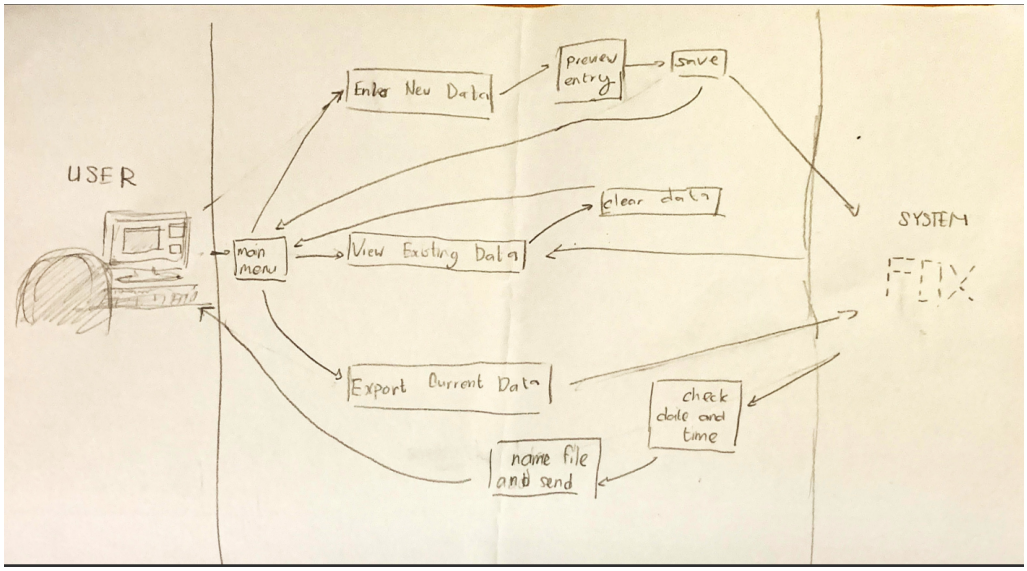
=== 2. Activity Diagram



=== 3. Use-Case Diagram



=== 4. Modules

So for this project, multiple modules were used.

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Pandas Module: This has allowed me to arrange, retrieve, and append data much more easily, especially since a .csv file was used. It has capabilities that are quite advanced and incredibly convenient, especially since I was programming a data oriented system.

Datetime Module: This one was used slightly less, though its functions were not to be underestimated. “Datetime” enables you to retrieve the current date and time, as the name implies. I used it to first format the date entry in the new entry function. This way, I knew for sure that the entry had to be in the format of YYYY/MM/DD. Data storage became much less trivial and easier on the eyes. Secondly was for the save file function. The save file is done under the name “finances_date.csv”, which allows users to easily find it and sort it.

SYS Module: One thing that I really wanted my program to have was a really easy on the eyes GUI, but still on the terminal. The Sys module, a system specific function module, was a large help with that. I could print the strings letter by letter with the module, and a little extra function. I also was able to delete the previous line, as that was useful with changing single lines without having to clear the entire screen.

OS Module: The OS module was the other module than was incredibly useful for altering the terminal. It allows inputs into the terminal directly, among other functions, though that was my main usage of the module. My favorite function of all time, “os.system(‘cls’)”, helps clear the screen and allows a more ‘GUI’ feel from within the terminal. My other usage was in the beginning of the program in which I needed to ensure that the user’s terminal was the right width and height. OS also helped getting those measurements, and a logical function was written with that.

Time Module: Last was the time module. In order to make my borders more interactive, I had to time it so that there was an animation effect to the program. Thus, in order to delay prints, I used time.sleep(), and added specific numbers. Actually, I built a function to help build a header or row whenever I needed it. Within the function, I used time.sleep() and the value the function takes, so that whenever I called it, I could specify the time delays I wanted. It was an incredibly handy function to have.

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=== 5. Essential Algorithms

Depth-First Search: The logical functions that I coded follow the structure of a Depth-First Search algorithm, as it goes through the ‘logical tree’ built until it cannot go deeper, ultimately going back to the beginning. Most of the code is similar to this.

A lot of my code is dependent on the user entering the input under the correct format, which is why a decent amount of logical tests are done to ensure that the data is entered seamlessly. Additionally, the “main menu” function is the most prominent follower of this algorithm, as it takes seven possible inputs, and an extra incorrect value input just in case. The code follows through with the inputs very thoroughly, and will keep running until it is out of commands, where it will finally backtrack.

In terms of my own “personal” algorithms, the most used one is the “GUI printing algorithms” that take animation delay and number of rows. The main one is buildFooterHeader() which takes a single argument, that is ‘animation delay’, with 0 being an instant print, and increased values making it slower. The other is buildRows(), taking two arguments that is ‘number of rows’ and ‘delay’, as it prints out the specified number of rows in an animated fashion, with increased delays once more slowing it down. While it may not be something groundbreaking in the world of code, I, frankly, take pride in it.

=== 6. Application Screenshots

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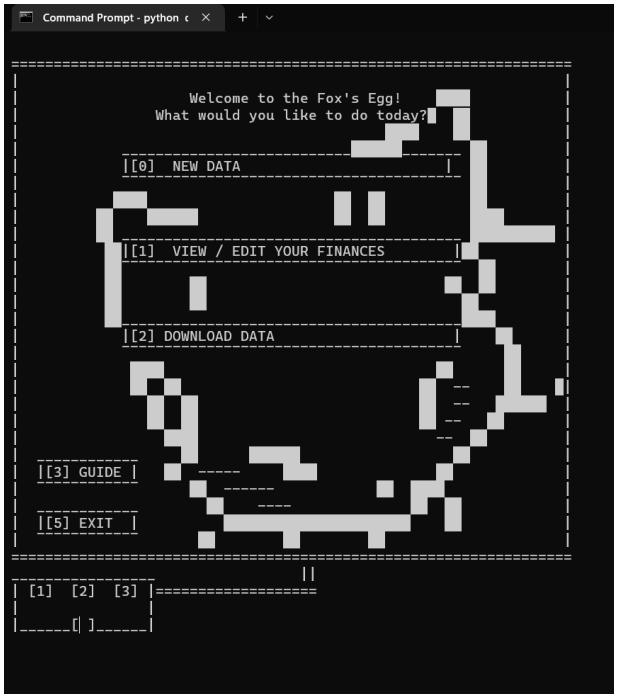
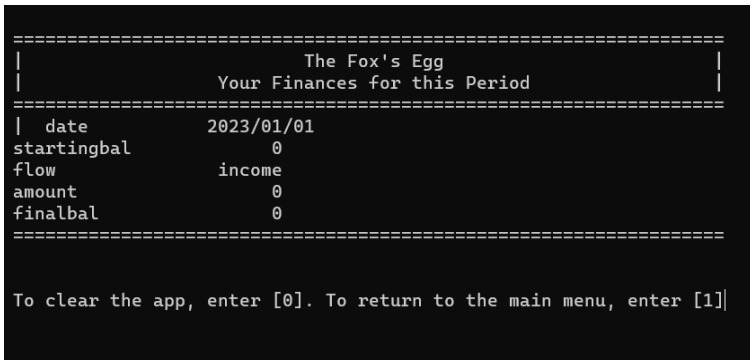


The Menu Screen



An Empty Finance Datasheet

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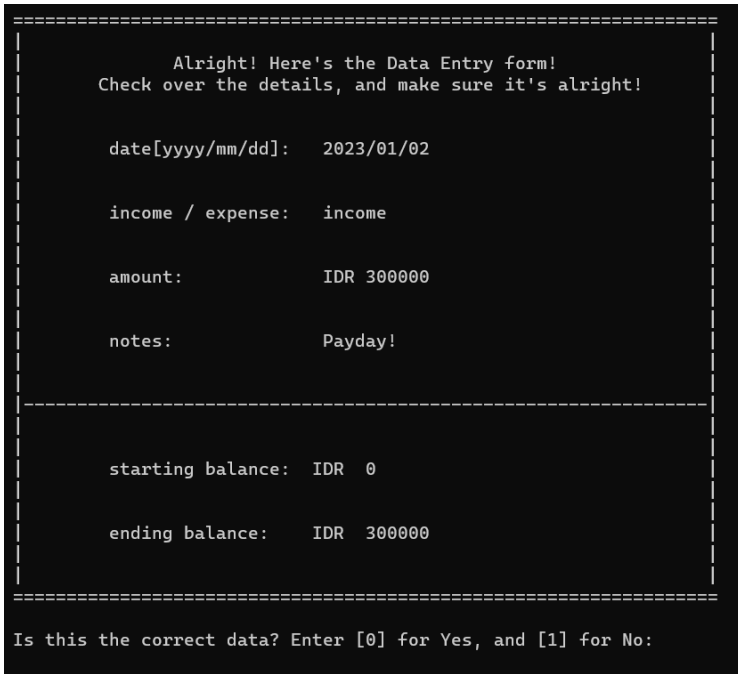

Data Entry Confirmation Form

Name Entry

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=== 7. Lessons Learned / Reflections

Well, I am not as good at code as I thought I was.

Theatrics aside, this shows how difficult the world of programming is. I had an abundance of time to do this, but assignments piled up with quicker deadlines, and the project slowly lost progress. This was the worst feeling for me, especially since I was incredibly passionate about this. Yet, once the small details got in the way, I was left with a mere week to finish the assignment. What made it worse was the fact that I had been learning too many languages for myself to process, with C, HTML, Javascript, CSS also in the way, I had lost touch with some of the most Python basics. What made it worse was I tried to define functions by using def function(){}, which had carried over.

Still, the last thing I would want to do even in such a precarious situation was flail helplessly. Nor did I want to take the easy way out, coding something simple or generic. So I decided to stick to my idea of using a GUI to code a finance app, with the GUI being coded on my own in Terminal. Thus, despite my lack of artistic sense, I tried my best and drew up borders, messed around with some art, and received some visually decent results. So, one lesson was definitely ASCII art manipulation.

Learning the other languages did help a bit. Thanks to the extensive work I did on HTML, I was able to visualize the GUI I wanted much more easily. That was a great relief, as those senses never came to me before. Since Javascript was not too far off from Python, I did retain some knowledge, thankfully. Maybe learning the two languages was a decent idea.

Time management. I suffered from poor time management in highschool, and here I am now. Still running it close to the clock, typing away as fast as I can. I managed it a bit better though, since I was able to send out all the assignments on time. Just hoping this one can be sent well before the deadline too.

Lastly was just the vastness of this subject. I heard of modules I never heard before, and incorporated it with ones I knew well. I asked advice from people I never knew had knowledge in the field. Algorithm and Programming, along with Computer Science, is just such a deep field

that I would never have considered exploring before highschool. I am most definitely glad I am on this course, and gaining these skills.

Signed,

Andrew Tanuwijaya.