



# Cairo University

## CS251-Assignment1-part1,2

Date: Feb25/2025

### FCAI

Name	ID	Work	Emails
Mahmo ud Sayed	2023037 2	Snake Game	<a href="mailto:yonesmahmoud538@gmail.com">yonesmahmoud538@gmail.com</a>  Leader's phone number: 01000081851
Amr Khaled	2023027 1	Bank System Simulato r	<a href="mailto:amrk4912@gmail.com">amrk4912@gmail.com</a>
Saif Omar	2023018 3 1	Car Rental System	<a href="mailto:saifomar2340@gmail.com">saifomar2340@gmail.com</a>

---

# Table of Contents

Table of Contents.....	2
CS251: Introduction to Software Engineering.....	4
Part 1 Report: Learning Java and Project Development.....	4
1. Chosen Language.....	4
2. Team Members and Learning Details.....	4
3. Project Descriptions.....	4
4. Screenshots & Video Links.....	5
5. Main Function of Each Project.....	5
Evaluation of low code no code:.....	7
What they can do:.....	7
Application Development:.....	7
Workflow Automation:.....	7
Data Management:.....	7
Website and Webpage Creation:.....	7
Rapid Prototyping:.....	8
Intgration with Other Services:.....	8
Examples of What They Can Do:.....	8
Will they take away all the coder jobs?.....	8
Lets take Bubble and Bildr as a sample:.....	8
• What they do:.....	8
• Benefits:.....	8
• System Quality:.....	9
• Developer Jobs:.....	9
Bubble vs. Bildr: A Simple Comparison:.....	9
• Bubble:.....	9

---

---

• Bildr:.....	9
• Features:.....	9
In simpler terms:.....	10
Comparison:.....	10
Resources:.....	12
PreProject Activities.....	13
Market and Gap Analysis.....	13
Global Practices:.....	13
Egypt's Market:.....	14
Gap Analysis:.....	14
Market Segmentation and Research.....	15
Customer Segments:.....	15
Demographics:.....	15
Rationale for Interest:.....	15
Domain Analysis.....	17
Benefits of performing domain analysis:.....	17
Domains terminology:.....	18
Glossary:.....	18
The Proposed Solution.....	19
Purpose and Goals.....	19
Key Features and Functionality.....	19
Target Users.....	20
Technologies.....	20

---

# CS251: Introduction to Software Engineering

## Part 1 Report: Learning Java and Project Development

### 1. Chosen Language

For this task, our team decided to learn and develop projects using **Java**.

### 2. Team Members and Learning Details

Team Member	ID	Hours Spent Learning	Learning Sources
Amr Khaled	20230271	16 hours	Desouki, Neseem, Java Documentation
Mahmoud Sayed	20230372	14-19 hours	W3Schools, Bro Code youtube channel, Java Documentation
Saif Omar	20230183	1 Day	W3Schools, Desouki, Java Documentation

### 3. Project Descriptions

Each team member developed a unique Java application. Below is a description of each project:

#### 1. *Banking System (By Amr Khaled, ID: 20230271)*

This project is a **banking management system** that allows users to register, log in, deposit, withdraw, and transfer money. It features a **transaction history system**, user authentication, and a simple menu-driven interface. The system uses file handling to save user accounts and transactions, ensuring data persistence between sessions. The core logic is built around Java **OOP principles**, particularly **encapsulation and serialization**.

---

## 2. Snake Game (By Mahmod Sayed, ID: 20230372)

Snake Game is a classic game loved by many people, in the game the player controls a snake by moving it on the screen to collect food. The more the snake eats, The more it grows and the more it grows, controlling the snake becomes more difficult as the player is trying to prevent the snake from bumping into the border of the frame or the body of the snake it self.

## 3. Car Rental System (By Saif Omar, ID: 20230183)

## 4. Screenshots & Video Links

Each team member has provided **6-10 screenshots** of their project and a **3-minute video** demonstrating the functionality.

Team Member	Screenshots	Video Link
Amr Khaled	<a href="#">Code ScreenShots</a>	<a href="#">Bank System Simulator by Amr Khaled</a>
Mahmoud Sayed	<a href="#">Code and Game ScreenShots</a>	<a href="#">Snake Game by Mahmoud Sayed</a>
Saif Omar	<a href="#">Code and ScreenShots</a>	<a href="#">Car rental by Saif eldeen omar</a>

## 5. Main Function of Each Project

### Banking System (Amr Khaled)

The main function of this program initializes the banking system, loads existing user accounts from a file, and presents a menu to the user. Based on user input, it calls appropriate methods to handle registration, login, deposits, withdrawals, transfers, and transaction history.

### Snake Game (Mahmod Sayed)

The main function creates a JFrame object by the name frame and sets it visible with size of \$frame\_h and \$frame\_w which are two values initialized in the main function with the value 600 for both, the frame is altered to open in the center of the screen by setting the location relativity to null, after that the main function create an object of type Game by the name

---

“snake game”, the class Game extends the class JPanel and is the manager of the logic needed by the game. after creating the snake\_game the main function starts it and adds it to the frame then pack every thing in it's preferred size using frame.pack the it uses the requestFocus method on the snake\_game instance to listen to input from the keyboard.

### *Car Rental System (Saif Omar)*

The Car Rental System is a Java-based console application that allows users to rent cars and administrators to manage the available car inventory. It provides functionalities for selecting car types, colors, and models, calculating rental prices, and offering discounts for long-term rentals. The system also includes an admin section where new cars can be added, prices can be updated, and existing cars can be removed.

---

## Evaluation of low code no code:

Low-code tools use user-facing interface that enables your organization's development team to speed up their work and reduce deployment time. No-code platforms allow citizen developers to manage and quickly deploy business applications  
no code provides drag-and-drop interfaces and pre-built components that users can combine to create simple software applications

### What they can do:

No-code and low-code tools have significantly broadened the scope of what individuals and businesses can achieve in software development

#### **Application Development:**

- They enable the creation of web applications, mobile apps, and desktop applications without extensive coding knowledge.
- This includes building user interfaces, defining workflows, and managing data.

#### **Workflow Automation:**

- These tools excel at automating repetitive tasks and business processes.
- Users can design automated workflows that connect different applications and services.

#### **Data Management:**

- Many platforms provide tools for creating and managing databases, allowing users to store and retrieve data easily.
- They facilitate data integration, enabling data to flow between different applications.

#### **Website and Webpage Creation:**

- No-code platforms simplify the process of building websites and landing pages, often with drag-and-drop interfaces and pre-built templates.

---

### **Rapid Prototyping:**

- They allow for quick creation of prototypes, enabling businesses to test ideas and gather feedback rapidly.

### **Integration with Other Services:**

- Many platforms offer integrations with popular third-party services, such as CRM systems, payment gateways, and social media platforms.

### **Examples of What They Can Do:**

- Build Customer Relationship Management (CRM) Systems
- Create E-commerce Platforms
- Develop Internal Tools
- Automate Data Entry and Processing
- Build Mobile Applications for Internal or External Use

### **Will they take away all the coder jobs?**

In my opinion, No, they help users to do their tasks and jobs quickly

better and faster, Coders can use them to build the basic stuff quicker, and then focus on the really tricky and we should upgrade it

### **Lets take Bubble and Bildr as a sample:**

Both Bubble and Bildr are "no-code" or "low-code" platforms. This means they let you build web apps and sometimes mobile apps without writing a ton of traditional code.

- **What they do:**
  - They give you visual tools to design how your app looks and works.
  - You can connect to databases and other services.
  - You can create user logins, forms, and complex workflows.
- **Benefits:**
  - Faster development: You can build things quicker than with coding.
  - Lower cost: You don't always need a big team of developers.



- 
- More accessible: People with less coding skill can create apps.
  - **System Quality:**
    - The quality depends a lot on how well you use the tools.
    - You can make good, working apps, but complex, high-performance systems might still need coding.
    - They are very good for MVP's (Minimum viable products) to test ideas quickly.
  - **Developer Jobs:**
    - These tools won't totally replace developers.
    - They change the job: developers can use these tools to build faster, or focus on the more complex parts that still need coding.
    - They also create a need for developers that can work within the no-code environments, and create plugins to extend the no-code platforms.

## **Bubble vs. Bildr: A Simple Comparison:**

**Here's a basic look at what each platform offers:**

- **Bubble:**
  - Known for its strong database and workflow features.
  - A lot of community support and plugins.
  - Can handle complex logic.
  - Has a large user base, and has been around for a long time.
- **Bildr:**
  - Focuses on visual design and building responsive layouts.
  - Good for creating user interfaces.
  - Tries to be very flexible with its design.
  - Is newer than bubble, and is still actively developing new features.
- **Features:**
  - Both have drag-and-drop interfaces.
  - Both let you connect to APIs.

- 
- Bubble might be stronger for complex back-end logic.
  - Bildr might be stronger for detailed front-end design.
  - Both allow for the creation of custom workflows.
  - Both allow for database integration.

## In simpler terms:

- Think of Bubble as good for making the "brain" of your app work well.
- Think of Bildr as good for making the "face" of your app look good.

They both have their uses, and the best choice depends on what you want to build.

Sources and related content

## Comparison:

Feature	Bubble	bildr
Core Focus	Strong back-end logic, database, workflows.	Detailed front-end design, visual control.
User Interface	Visual drag-and-drop, can be a steeper learning curve.	Highly flexible visual builder, strong on design.
Database Capabilities	Robust built-in database, good for complex data.	Database integrations, emphasis on connecting to data
Workflow Logic	Very powerful workflow editor, can handle intricate processes.	Workflow automation, customizable triggers and actions.
Front-End Design	Responsive design, wide range of visual elements.	Very high control over design, pixel-perfect layouts.

Plugin/Integration	Large plugin marketplace,	API connections, focused on
--------------------	---------------------------	-----------------------------

---

---

	many API connections.	direct integrations.
<b>Learning Curve</b>	Can be significant, due to depth of features.	Varies, design freedom requires attention to detail.
<b>Community Support</b>	Very large and active community, many resources.	Growing community, uses platforms like Discord.
<b>Ideal Use Cases</b>	Complex web applications, data-heavy apps.	Visually rich web apps, internal tools, custom UIs.
<b>Coding capabilities</b>	Little to no coding needed within the platform itself, but can integrate custom code.	Access to custom code embedding, allowing html, CSS and javascript to be used.

**A sample app with Bubble video :**

<https://drive.google.com/drive/folders/1sbBTbCjCd8P541OyL6jS7fpAWDW2P2f9?usp=sharing>

**A sample app with Bubble Screen shots :**

<https://drive.google.com/drive/folders/1Jz9RmUNriPGPJbKD3FDmU8y-c1vn5FAR?usp=sharing>

---

## Resources:

<https://www.joinsecret.com/compare/bildr-vs-bubble>

<https://zerocode.com/no-code-tools/bildr-review/>

<https://www.avoxi.com/blog/evaluating-low-code-vs-no-code-business-users/>

<https://www.appedge.io/post/no-code-low-code-web-development-tools-comparison-bubble-webflow-flutterflow-noodl-bildr-and-wappler>

<https://www.netguru.com/blog/bubble-no-code-development>

<https://www.google.com/search?q=https://www.belightted.com/blog/no-code-review>

---

# PreProject Activities

## Market and Gap Analysis

### Global Practices:

Effectively managing your investments can be a challenging mission, most of the time it can be a messy or a complicated task. Personal investment management software around the world, offers a number of tools and features to help people in managing their investment smoothly.

#### Key functionalities include:

- ◆ **Portfolio Tracking:** monitoring a number of diverse assets in Real time. Examples will include: stocks, real estate, savings and cryptocurrencies.
- ◆ **Income Tracking:** shows a clear image of the user's financial situation by tracking income streams from different sources and investments.
- ◆ **Net Worth Computation:** evaluates financial performance by calculating overall net worth and assessing the return on investment.
- ◆ **Visualization and Graphs:** making good use of charts and graphs to monitor investment performance, supporting easy analysis and comparison with previous data.
- ◆ **Target Setting:** allows users to set goals, such as income targets and retirement objectives.
- ◆ **Risk and Asset Allocation:** balances investments across different asset types to ensure diversity.
- ◆ **Integration:** ensures seamless data aggregation by syncing with bank accounts, stock prices, and other financial platforms.

---

## Egypt's Market:

There are several platforms that offer the service of investment and asset management, **below are few of them:**

- ◆ **Target Investment Group(TIG):** offers managements for portfolios and different investment strategies, ensuring effective financial services.
- ◆ **Misr Capital:** Misr capital provides a wide range of investment opportunities aligned with different risk appetites, making it one of the leading asset managers in Egypt.
- ◆ **CI Capital Asset Management(CIAM):** one of the most recognized asset managers in Egypt and the surrounding region, CIAM offers products accross various asset classes.

## Gap Analysis:

although there are effective and different well known investment management services in Egypt, that doesn't remove all the gaps that exist in the market.

**Examples of those gaps include:**

- ◆ **Comprehensive Personal Investment Management:** Most investment management services in Egypt focus mainly on high-net-worth individuals or clients belonging to an institution, this makes a huge gap for platforms that are made to tailor the general by focusing on personal investment management.
- ◆ **Integration of Emerging Asset Classes:** New opportunities arise every day waiting for investors to tackle them, which can be challenging to monitor as there is a limited support for tracking newer asset classes, such as cryptocurrencies.
- ◆ **User-Friendly Digital Platforms:** Starting can be a challenge for most people as the need for more user friendly platforms arise, which creates a gap for more comprehensive investment management tools that can be used by a broader audience.
- ◆ **Financial Literacy and Advisory Services:** Financial Literacy is a very complex topic for most people and wasn't stressed on enough in schools, which can make taking money related decisions challenging for most people, this creates a gap for educational resources and advisory services to assist users in taking well calculated decision when it comes to finance.

---

## Market Segmentation and Research

### Customer Segments:

- ◆ **Young Adults (20-30 years):** Individuals beginning their careers and interested in starting their investment journeys.
- ◆ **Mid-Career Professionals (31-45 years):** Individuals with established careers seeking to diversify and manage their investment portfolios effectively.
- ◆ **High-Net-Worth Individuals:** Investors with substantial assets requiring sophisticated investment management tools.

### Demographics:

- ◆ **Age:** 20-60 years
- ◆ **Income:** Middle to high-income brackets
- ◆ **Education Level:** At least a university degree
- ◆ **Tech Usage Patterns:** Comfortable with digital platforms, regularly use smartphones and computers, and engage with online financial services.

### Rationale for Interest:

- ◆ **Young Adults:** Ready to build and monitor their investment portfolios, set financial goals, and make good use of educational resources to improve financial literacy.
- ◆ **Mid-Career Professionals:** Seeking tools for effective portfolio management, risk assessment, and performance analysis to optimize investment returns.
- ◆ **High-Net-Worth Individuals:** Requiring advanced features like detailed performance analytics, risk management, and personalized advisory services to manage substantial and diverse investments.

---

By addressing the identified gaps and catering to the specific needs of these customer segments, a personal investment management software can add significant value to users in Egypt and the broader Arab region.



---

## Domain Analysis

The domain is the general field of business or technology in which the clients will use the software ,Domain analysis is the process by which a software engineer learns background information:

In software engineering, domain analysis is the process of analyzing related software systems in a domain to find their common and variable parts. It is a model of wider business context for the system, Several domain analysis techniques have been identified, proposed and developed due to the diversity of goals, domains, and involved processes.

The approach to domain analysis is that you, or the system, review the column's distinct data values to mark any data value considered to be “invalid”.

The system has multiple types of domain analysis for example: techniques, that can be used to perform the function. The criteria differ for determining valid from invalid data values, but all result in identifying and marking the column's data values as invalid when appropriate. The system assumes which type to use based on the data class of the column in question. However, you can choose to use any of the domain analysis types for any column regardless of its data class. The three domain analysis types are:

- Value, where you manually review all data values
- Range, where you set minimum and maximum valid data values
- Reference File, where the system uses an external validity file

### **Benefits of performing domain analysis:**

Faster development

Better system

Avoiding misunderstanding

Anticipation of extensions

---

## Domains terminology:

A domain, or domain name, is the web address or URL that people use to visit your website on the internet. Domain names display in the address bar of your web browser, such as Chrome, Firefox, Microsoft Edge, or Safari.

- Individual Investors – Manage their assets, track returns, and set financial goals.
- Financial Advisors – Use software to assist clients in managing investments.
- Banks & Brokerages – Provide data and integration for real-time tracking.
- Regulatory Authorities – Oversee financial compliance and security in investment tools.

## Glossary:

**Open event:** An event that starts at a precise instant but with no predetermined duration

**Fixed event:** An event that starts at a precise instant and with a predetermined duration

**Day events:** An event associated with a particular day without precise start and end times

**Recurrent event:** An event that occurs repeatedly on some regular schedule (for example daily, weekly or monthly).

**Composite event:** An event composed of several sub-events. For example, a training activity can be composed of a registration period (fixed event),

---

## The Proposed Solution

### Purpose and Goals

Our individual investment management software is designed to provide investments with a broad platform for tracking, management and adaptation. The aim of the software is:

- Enable real -time investment tracking in different asset classes including stocks, real estate ,shares, assets, cryptocurrency.
- Provide financial insight and analysis to help users make informed decisions.
- Increase risk management by analyzing the allocation of assets and providing diversification proposals.
- Use financial plan with AI-controlled recommendations to fit user preferences and market trends.

### Key Features and Functionality

Software will include the following properties:

- Portfolio tracking: A dashboard, which shows all investment funds, is classified according to types (stock, bonds, property, crypto, etc.).
- Income tracking: Dividend of log revenue from investments such as rental income and stock benefits.

Net-Worth Compute: Software automatically tracks and updates the user's net value by analyzing its total assets and liabilities, giving them a clear picture of their financial health.

- Visualization and graph: Real -Time charts and investment performance produce reports showing market trends and estimates.
- Risk and asset allocation analysis: Investment analysis suggests risk and diversification strategies.
- Target -drawn investment scheme: Allows users to determine financial goals and track progress towards achieving them.
- Integration with bank accounts and stock markets: Synchronized automatically with large banks and financial institutions to update transactions.

- 
- AI -Driven Investment Insight: User user to propose investment strategies based on machine learning preferences and historical data.

## **Target Users**

- Individual investors
- Financial advisor
- Business owners and entrepreneurs
- Technical service users

## **Technologies**

To create a scalable, safe and user -friendly solution, the following technological stacks will be used:

- **Backend :** .net core (C#) or Java Spring Boot. Residual API to connect to front and third-party services.
- **front end :** Angle for a responsible network section. flutter for mobile application
- **Database:** MS SQL server for structured financial data storage. Firebase for real -time updates and authentication.
- **Third -party API and integration:** API for stock market on real -time market data. Bank API for account integration and transaction.AI/ML Framework (TensorFlow) for future financial insight.
- **Hosting :** Cloud -based perfection on AWS, Azure or Firebase for high availability. Safety facilities including (2FA) and end-to-end encryption.