



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

PT-2

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THE MATRIX

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Project Report

SDG E-Quiz

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1. Introduction

The SDG E-Quiz project represents a pioneering initiative that harnesses the power of technology to impart accessibility and engagement to the Sustainable Development Goals (SDGs) established by the global community in 2015. This visionary project transcends the conventional boundaries of a mere quiz, seeking to demystify the 17 SDGs that encompass critical objectives ranging from eradicating poverty to advancing health, education, economic prosperity, and addressing the urgent challenges of climate change. These goals, collectively agreed upon in the pursuit of a sustainable future, often remain enigmatic to a broader audience, posing a significant obstacle to their effective implementation. The importance of such initiatives cannot be overstated, considering the substantial gap in widespread knowledge and awareness surrounding the SDGs. As numerous studies emphasize, a lack of understanding among the general population poses a formidable challenge to the successful execution of these global objectives (Smith et al., 2020). The SDG E-Quiz seeks to bridge this knowledge gap by providing a dynamic and interactive platform for learning. The gamified approach adopted by the SDG E-Quiz is rooted in the understanding that traditional methods of disseminating information may not be sufficient to inspire collective action. Research indicates that gamification can enhance engagement and motivation, contributing to more effective learning outcomes (Deterding et al., 2011). The interactive quiz format is designed not only to impart knowledge but also to instill a sense of ownership and responsibility toward the SDGs. This sense of ownership is crucial, as studies suggest that a personal connection to global issues can significantly influence individual behavior and choices (Hungerford & Volk, 1990).

The foundational principle of the SDG E-Quiz is rooted in the belief that technology can serve as a conduit for transforming complex information into an accessible and engaging format. This approach is in alignment with the spirit of the SDGs, which call for inclusive and participatory efforts to address pressing global issues. In today's interconnected world, where technology is an integral part of daily life, the SDG E-Quiz stands as a beacon for leveraging these advancements to facilitate a profound understanding of the SDGs.

2.0 Problem Background and Proposed Solution

2.1 Problem Background

Currently, global awareness and understanding of the Sustainable Development Goals (SDGs) remain limited, posing a significant obstacle to their effective implementation. Despite addressing critical issues such as poverty, health, and climate change, the SDGs often exist within official documents, failing to capture widespread attention. This lack of comprehension hinders collective action and engagement. The SDG E-Quiz project addresses this gap by proposing an engaging E-Quiz system. Leveraging technology, it transforms complex SDG concepts into an interactive experience, particularly targeting the youth. This initiative aims to elevate awareness, making the SDGs relatable and fostering a sense of personal responsibility for global challenges in a younger audience.

2.2 Proposed Solution

To address the challenge of limited awareness about the Sustainable Development Goals (SDGs), we propose the development of an interactive E-Quiz system. The implementation process involves leveraging technology to create a user-friendly online platform accessible to a wide audience. The E-Quiz aims to break down complex SDG concepts into easily understandable and relatable content, specifically targeting the younger generation. Our implementation process follows a meticulous plan:

1. Gamified Approach: The E-Quiz employs gamification principles to make learning about the SDGs enjoyable and dynamic. Users engage with the content in a playful manner, enhancing comprehension and retention.

2. User-Centric Design: The system allows users to choose quizzes based on specific SDGs or explore all goals, tailoring the learning experience to individual interests. This user-centric approach enhances personalization.

3. Randomization Feature: To keep the quizzes engaging and diverse, a randomization feature is implemented. This ensures that users receive a varied set of multiple-choice questions, maintaining interest and unpredictability.

4. Comprehensive Information Pages: Beyond quizzes, detailed information pages for each SDG are incorporated. These pages act as knowledge hubs, providing in-depth insights into the goals and fostering a deeper understanding.

5. Instant Feedback Mechanism: The E-Quiz system offers instant feedback and clear explanations for each question. This immediate reinforcement enhances the learning process, ensuring users not only know the facts but understand the significance of each SDG.

By intertwining education with interaction, the implementation process of the SDG E-Quiz aims to create a dynamic platform that transcends traditional learning methods. Through technology-driven engagement, we strive to empower users, especially the younger generation, to become informed advocates and contributors to the achievement of the SDGs. In the contemporary landscape, fostering widespread awareness and comprehension of the SDGs stands as a paramount necessity for fostering global collaboration. Recognizing this imperative, the proposed solution takes the form of an E-Quiz system, skillfully crafted using the principles of Object-Oriented Programming (OOP) in C++. This innovative platform seeks to supplant conventional information dissemination methods, offering an engaging and interactive medium for users to delve into the intricacies of the SDGs.

3.0 Objectives

The objective of this project is to develop an E-Quiz system that educates users about the SDGs in an engaging and interactive way. The system will feature a quiz game where users answer questions related to the different SDGs. The aim is to increase awareness and understanding of the SDGs among the general public, particularly young people

The pivotal objectives of the SDG E-Quiz project encompass:

- ❖ - Development of a technologically advanced E-Quiz system, utilizing the principles of C++ OOP.
- ❖ - Targeted education outreach, especially to the younger demographic, elucidating the nuances of all 17 SDGs.
- ❖ - Systematic elevation of awareness and comprehension regarding the SDGs on a global scale.
- ❖ - A concerted effort to contribute to SDG 4: Quality Education, with a specific focus on achieving target 4.7.

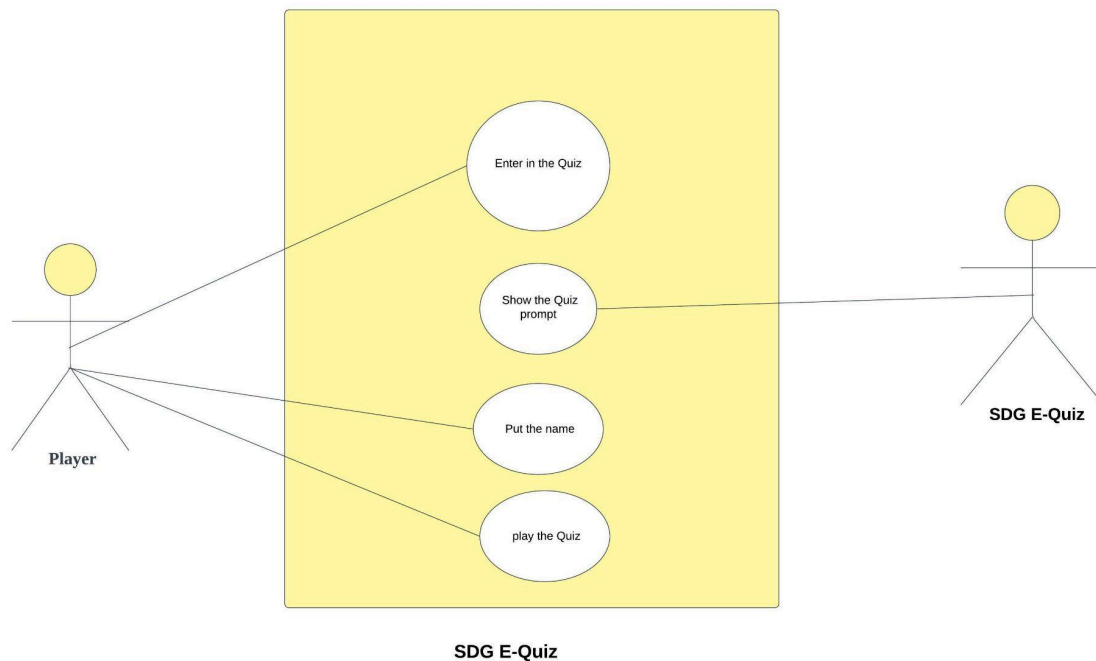
4.0 scope

- Developing a cool quiz system using C++ OOP concepts to make it easy and fun for users. We're talking about applying some fancy programming principles to make sure the quiz runs smoothly and is user-friendly.
- Giving users the freedom to pick the quizzes they want. You can go for quizzes on specific SDGs or mix it up and cover all the goals. It's all about making learning personal, so you get what you're interested in and understand the full picture of the SDGs.
- Spicing up the quizzes by throwing in a bit of randomness. We're adding a feature that pulls in random multiple-choice questions from a stash. Keeps things interesting and ensures you get a varied and engaging experience every time you quiz.
- Making it more than just a quiz by adding info pages for each SDG. These pages are like treasure troves of detailed knowledge, giving you the lowdown on each goal. It's about going beyond the basics and arming you with a solid understanding of the ins and outs of the SDGs.

5.0 class design

The Class Diagram for the SDG E-Quiz project illustrates the relationships and interactions among key classes. The primary classes include QuizItem, Question, Quiz, and Player. QuizItem serves as the base abstract class, defining the common interface for quiz items. Question extends QuizItem and represents a specific type of quiz item with a question, options, and correct answer.

The Quiz class manages a collection of quiz items and orchestrates the quiz-taking process. It interacts with Player, representing the participant, and guides them through the quiz. The aggregation relationship between Quiz and QuizItem signifies that a quiz is composed of multiple quiz items. In UML Diagram we may get a brief overview about this :



UML diagram

5.1 class diagram

The class design for the SDG E-Quiz project follows an object-oriented programming (OOP) paradigm, aiming for a structured and modular system. The primary classes in the system include **QuizItem**, **Question**, **Quiz**, and **Player**.

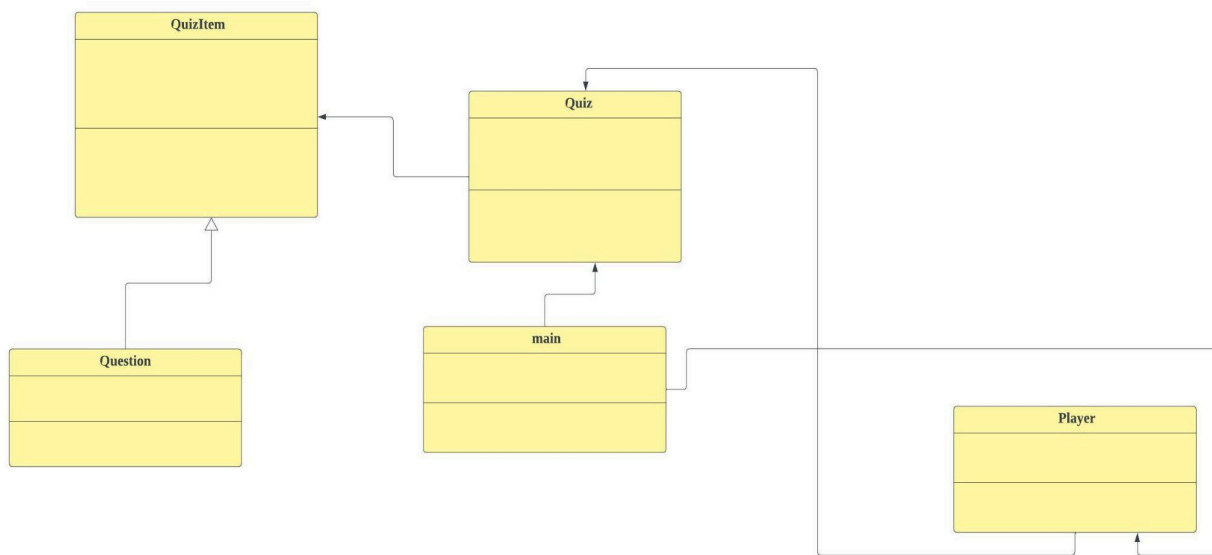
- **QuizItem** is an abstract base class representing a generic quiz item. It defines virtual methods for displaying the quiz, checking user answers, and displaying correct answers.

- **Question** is a derived class from QuizItem representing a specific quiz question. It encapsulates the details of a question, including the sequence number, the question itself, options, correct answer, and methods to display and check answers.

- **Quiz** is the central class that orchestrates the entire quiz experience. It contains a collection of QuizItem pointers, initialized with instances of Question. The Quiz class manages the quiz flow, displaying questions, receiving user input, and calculating the final score.

- **Player** is a simple class representing a player participating in the quiz. It holds the player's name.

The class diagram visually represents the relationships between these classes, illustrating associations and dependencies.



Class diagram of SDG E-Quiz

5.2 extended class diagram

The extended class diagram delves into more details regarding attributes and methods for each class:

- **QuizItem Class:**
 - Attributes: No concrete attributes, as it is an abstract base class.
 - Methods:
 - virtual void show() const = 0: A pure virtual function to display the quiz item.
 - virtual bool check(int user_answer) const = 0: A pure virtual function to check the user's answer.
 - virtual void displayCorrectAnswer() const = 0: A pure virtual function to display the correct answer.
- **Question Class (Derived from QuizItem):**
 - Attributes:
 - int sequence: Sequence number of the question.
 - string question: The question text.
 - string option1, option2, option3: Options for the question.
 - int answer: Correct answer (1, 2, or 3).
 - Methods:
 - void show() const override: Displays the question and options.
 - bool check(int user_answer) const override: Checks if the user's answer is correct.
 - void displayCorrectAnswer() const override: Displays the correct answer and an explanation.

- Quiz Class:

- Attributes:

- vector<QuizItem*> quizItems: Collection of quiz items.

- Methods:

- void run(): Executes the quiz, displaying questions, receiving user input, and calculating the final score.

- Player Class:

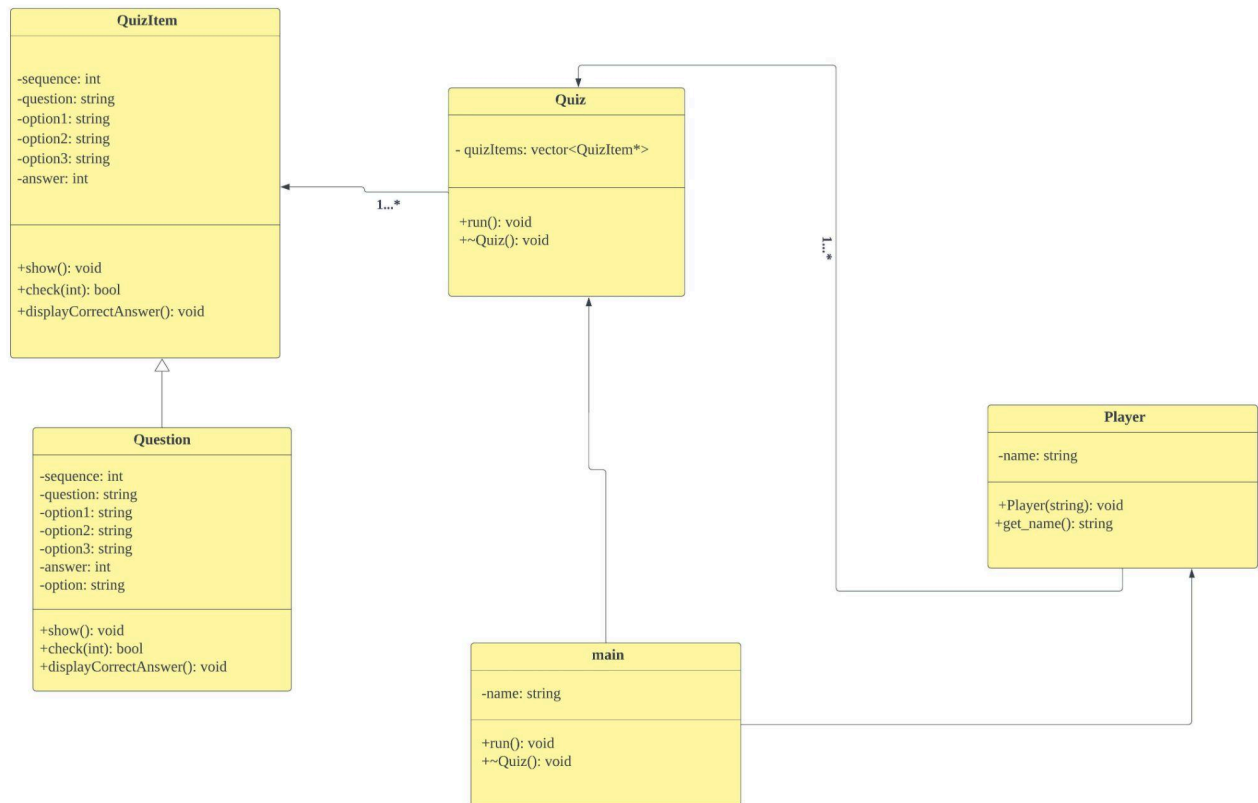
- Attributes:

- string name: Player's name.

- Methods:

- string get_name() const: Retrieves the player's name.

This detailed class diagram provides a comprehensive overview of the structure and functionalities of each class, aiding in the implementation and understanding of the code architecture.



Extended class diagram

6.0 Benefit and Summary of the Proposed System

The SDG E-Quiz system promises multifaceted benefits, aligning with Sustainable Development Goal 4: Quality Education, specifically targeting target 4.7. By transforming learning about the 17 Sustainable Development Goals (SDGs) into an interactive and enjoyable experience, the project contributes significantly to fostering sustainable development. The user-friendly online platform aims to cultivate a deeper understanding of the SDGs, particularly among the younger generation.

For users, the benefits are substantial. The SDG E-Quiz is more than an information-sharing tool; it's an engaging platform that provides instant feedback and detailed explanations. By making the SDGs relatable and accessible, the system encourages users to explore and connect with each goal. Through a gamified approach, it not only imparts knowledge but also instills a sense of ownership and engagement. The incorporation of random questions ensures a varied and engaging experience in each quiz session.

In essence, the SDG E-Quiz is a gateway to quality education, offering a pathway to building a community of informed and motivated individuals ready to contribute to the achievement of the SDGs. It stands as a valuable resource for educators, students, and anyone passionate about positive change. Beyond the realm of traditional learning, this project seeks to empower users with a comprehensive understanding of the SDGs and their implications in the context of global challenges. The envisioned impact is not merely about disseminating information but fostering a generation actively involved in shaping a sustainable future.

7. Recorded Link:

<https://youtu.be/bJuUzJXPyzc>

8.0 interfaces and output :

Menu for start quiz and exit quiz :

```
PS C:\Users\khaled mahmud sujon\Desktop\6th sem\pt-2\PROJECT> cd "c:\Users\khaled mahmud sujon\Desktop\6th sem\pt-2\PROJECT"
.\third }
Hey, no more wait! We are group matrix so excited to help you. Please enter your name: khaled
please use your matric no to be in the quiz! enter your matric number: A20EC4082
Are you a student of UTM? (yes/no): YES

Main Menu
1. Start Quiz
2. Exit
Enter your choice: █
```

Start or exit :

```
Main Menu
1. Start Quiz
2. Exit
Enter your choice: 1
Welcome to the UN SDG Quiz game! We have built it as our Programming Technique 2 project!
Question 1: What is the goal of SDG 17?
1. To end poverty
2. To promote gender equality
3. To strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development
Enter your answer: █
```

Play the quiz

```
Welcome to the UN SDG Quiz game! We have built it as our Programming Technique 2 project!
Question 1: What is the goal of SDG 17?
1. To end poverty
2. To promote gender equality
3. To strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development
Enter your answer: 1
Incorrect. Don't worry, keep going!
Correct answer: 3. Explanation: To strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development
```

Encouragement for correct answer :

```
Question 11: How does SDG 17 contribute to global health?
1. By providing healthcare services directly
2. By supporting international cooperation for health
3. By focusing only on local health issues
Enter your answer: 2
Correct! Congratulations!
```

For wrong answer :

```
Question 8: What is the role of SDG 17 in addressing global trade challenges?
1. Promoting protectionism
2. Encouraging fair and equitable trade
3. Restricting trade agreements
Enter your answer: 1
Incorrect. Don't worry, keep going!
```

Counting final score :

```
Correct! Congratulations!
Your final score is 6 out of 21
```

Exit the quiz :

```
Main Menu
1. Start Quiz
2. Exit
Enter your choice: 2
Thank you for playing this Quiz, and thanks to our lecturer Dr. Jamilah Mahmood. I am khaled!
```

9.0 Conclusion

In conclusion, the SDG E-Quiz project is a visionary endeavor that brings together the realms of technology, education, and global citizenship to address the critical challenge of raising awareness and understanding of the Sustainable Development Goals (SDGs). The world, as outlined in the 2030 Agenda, has committed to achieving these goals, which encompass a wide spectrum of urgent issues ranging from poverty alleviation to climate action. However, the effectiveness of these goals is contingent upon widespread knowledge and active participation, a gap that the SDG E-Quiz seeks to bridge.

By employing technology as a medium, the project not only breaks down complex SDG concepts into accessible formats but also engages users in an interactive and gamified experience. This approach is crucial, especially in targeting the younger generation, who will play a pivotal role in the future realization of these goals. The fusion of education with technology, presented in the form of quizzes and informative pages, transforms the learning process from a passive endeavor into an active exploration of global challenges.

The SDG E-Quiz is not just an educational tool; it is a call to action, urging individuals worldwide to become informed and motivated contributors to a sustainable future. Its impact extends beyond the digital realm, encouraging a sense of ownership and responsibility for the SDGs. The project's emphasis on immediate feedback and detailed explanations ensures that users not only acquire information but also develop a profound understanding of why each SDG matters.

References :

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- [2] Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining" gamification". In **Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments** (pp. 9–15).

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