

Teaching to Display Text, Symbols, and ASCII Images Using Turbo Pascal to First-Semester Electrical Engineering Students

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Abstract: This community service activity aims to help first-semester Electrical Engineering students improve their understanding of basic programming concepts using Turbo Pascal, with a focus on displaying text, symbols, and ASCII-based images. The approach combines both theoretical instruction and hands-on practice. Students receive materials covering the use of the Write and Writeln functions in Turbo Pascal, as well as techniques for creating simple text-based images using ASCII characters. The results show that most students have successfully grasped the material, created basic programs, and actively participated in the training sessions. This activity is designed to strengthen the programming foundation of Electrical Engineering students, providing a solid base for further development of their programming skills.

1. INTRODUCTION

The rapid advancement of information and communication technology in the 21st century has transformed nearly every sector, including education (Sukowati, 2011). One essential skill that students across various fields, including Electrical Engineering, must develop is computer programming (Naufal, 2018). Programming is not only crucial for data processing (Santosa, 2015) but also for hardware applications (N. E. Putri, 2017) commonly used in engineering. Turbo Pascal (Noor, 2006) is a simple yet valuable programming language (Aulia & others, 2024) that serves as an excellent starting point for understanding key programming concepts (Yahfizham & others, 2023), algorithms (Aritonang, 2022), and logic (Ritonga & Yahfizham, 2023). While more modern programming languages (Aulia & others, 2024) are now more widely used, Turbo Pascal (Nurdini, 2015) remains an important tool for Electrical Engineering students, providing a strong foundation in programming (Rangkuti & Yahfizham, 2023). In Electrical Engineering, one important skill students must master is displaying text (Firdaus & Firdaus, 2021), symbols, and images within a text (Sukriadi et al., 2023)-based interface. This skill is crucial for developing programs used in a variety of applications, such as device control, signal processing, and data management. However, many

students struggle when trying to use Turbo Pascal for displaying these elements. To address this challenge, this community service program aims to provide first-semester Electrical Engineering students with practical training on how to effectively display text (Deolika et al., 2019), symbols, and images using Turbo Pascal.

2. METHOD

This community service activity follows a structured approach with several key stages:

1. Socialization and Introduction to the Material

The first stage begins with an introduction to the goals and benefits of learning Turbo Pascal for Electrical Engineering students. Students are familiarized with the basic concepts of Turbo Pascal and its significance in supporting practical activities and developing text (Rifaldi et al., 2023) -based applications. The session also covers essential functions, such as Write and Writeln, as well as the use of ASCII characters to create symbols and images.

2. Demonstration and Hands-on Practice

Once the material is introduced, a live demonstration shows students how to display text (E. K. Putri & Setiadi, 2014) and symbols using Turbo Pascal. Techniques for creating images using ASCII characters are also demonstrated. This hands-on session aims to give students a practical understanding of how Turbo Pascal can be used to display visual elements in text-based programs (DjajaPutra et al., 2020).

3. Independent Practice and Collaboration

Students are divided into small groups for independent practice. Each group is assigned a task to create a program that displays text (Dharmendra et al., 2023), symbols, and images. During this session, students are encouraged to collaborate and discuss solutions to any challenges they encounter.

4. Evaluation and Mentoring

After the practice session, an evaluation is conducted to assess how well students have applied the material. Mentoring is provided to help students who may have faced difficulties and to offer constructive feedback on their work.

3. RESULTS

The community service activity achieved significant outcomes, benefiting both the students and their programming skills development. Below are the key achievements:

Understanding Basic Programming Concepts

Most students successfully mastered the basics of programming using Turbo Pascal, especially in displaying text (Parjono & Kusumadewi, 2023) and symbols. They not only learned to use functions like Write and Writeln but also understood how to format output using additional parameters. Moreover, students grasped essential programming concepts such as controlling program flow and using loops to print patterns or symbols. They also learned to use ASCII characters to display specific symbols, like quotation marks or other non-printable characters. This shows that students went beyond just learning syntax—they also understood how to apply it in a broader programming context.

Practical Skills in Program Creation

A key achievement was the students' ability to apply their knowledge by creating simple programs. Many students successfully designed programs that displayed text (Thenata, 2021), text (Mailoa, 2019) -based images, and geometric patterns using ASCII characters like asterisks (*), minus signs (-), and others. Beyond displaying basic text (Zamzam et al., 2020), students also created programs to generate more complex visual displays (Junaedi & Cholisana, 2021), such as pyramids and boxes. This success demonstrates that students not only understood the theory but were also able to implement it into functioning programs.

Student Enthusiasm and Participation

Throughout the activity, students showed exceptional enthusiasm and engagement. They were actively involved in every session, both theoretical (Marliyah, 2021) and practical. Group discussions were productive, with students exchanging ideas and helping each other solve programming challenges. Many questions were asked, reflecting their curiosity and eagerness to deepen their understanding of the material. This high level of participation indicates that the activity not only delivered knowledge but also boosted students' confidence in their programming skills. Overall, this activity enhanced students' understanding of Turbo Pascal, strengthened their logical and creative thinking, and paved the way for similar future activities that can further develop their technical abilities in programming and information technology.

Discussion

This activity demonstrates that, even though Turbo Pascal is an older programming language, it remains highly relevant for teaching the basics of programming at the university level, particularly for Electrical Engineering students. Learning to display text, symbols, and images in text-based programs has proven effective in introducing fundamental concepts like output commands, control flow, and the use of ASCII characters.

However, during the activity, several technical challenges arose:

1. Challenges for Students with No Programming Experience

Some students without prior programming experience found it difficult to grasp the basic concepts of text-based programming. This highlights the need to place more emphasis on teaching the core structure of programming languages at the start of the course.

2. Software Compatibility Issues

Although Turbo Pascal can be run on modern operating systems via an emulator, some students struggled with installing and configuring the necessary software. To resolve this, providing more detailed installation guides and configuration instructions would be helpful.

3. Limitations in Creating More Complex Images

While students were able to create simple images using ASCII characters, they faced difficulties when trying to design more complex images or interactive displays. This highlights the fact that for such tasks, using a more modern programming language may be necessary.

Below is the documentation of this activity.



Figure 1. Learning activity of displaying text using Turbo Pascal.



Figure 2. Learning activity of displaying images using Turbo Pascal.

4. SUMMARY

Based on the results of this community service activity, it can be concluded that learning Turbo Pascal plays a significant role in helping first-semester Electrical Engineering students understand the basics of programming. Although Turbo Pascal is a relatively old programming language, it remains relevant as a teaching tool for beginner programmers. Through this activity, students not only learned how to write code but also understood how to control visual output in text-based programs. The technique of displaying text using commands like `Write` and `Writeln` is fundamental and crucial to grasp, as it forms the basis for creating applications that interact with users through text-based interfaces.

Furthermore, students were taught to use ASCII characters as symbols to represent various visual elements, such as shapes and patterns. This technique helped students understand how to organize information visually, even in a limited environment like a text console. The introduction of character-based images also expanded their perspective on data and information representation in a simpler yet still effective form. All of this provides a strong foundation for students to learn advanced programming concepts and develop algorithmic thinking skills needed for software development in Electrical Engineering.

This learning also provides a solid base for understanding the interaction between software and hardware. The ability to control text output is highly relevant in applications such as data processing or computer-based system control. With a grasp of these basic programming concepts, students can easily transition to more advanced programming languages and develop more interactive and complex applications in the future.

Additionally, students demonstrated a good understanding of using basic Turbo Pascal functions to display text and simple images using ASCII characters. They were able to implement basic commands like Write and Writeln to display text in various formats and use ASCII characters to create simple images or patterns. The use of ASCII characters allowed students to explore creative ways to arrange visual shapes, even with just standard symbols.

Most students successfully created programs that not only displayed text but also generated image patterns such as lines, boxes, or other shapes using combinations of characters like asterisks (*), plus signs (+), or minus signs (-). This demonstrates their understanding of basic text manipulation concepts and programming logic, which are essential for further programming skills development.

This ability also reflects students' understanding of how to control the flow of output and arrange visual elements in a text-based program.

These skills are useful in various Electrical Engineering applications, such as creating text-based user interfaces for hardware or simple systems, or even generating text-based reports from data processing. With mastery of these fundamental techniques, students are now more confident in developing more complex programs involving data processing or hardware programming, which is highly relevant in the field of Electrical Engineering.

Overall, this achievement shows that students have mastered the basics of using Turbo Pascal to effectively display text and images. This opens up opportunities for them to move on to more advanced topics, such as graphic interface development or visual-based applications, with a solid programming foundation already in place.

In addition to the above achievements, it can also be concluded that technical challenges, such as software issues and limited programming experience, can be overcome by providing additional materials and further guidance. Although some students encountered technical difficulties, particularly related to setting up and ensuring the compatibility of Turbo Pascal on modern operating systems, these issues could be resolved by offering more detailed instructions on how to install and configure the software correctly.

Furthermore, students with no prior programming experience received direct guidance on basic programming concepts, such as syntax introduction, program flow management, and the use of basic functions. The guidance provided during the training sessions, both through direct tutorials and Q&A sessions, was effective in helping students understand and overcome the challenges they faced. Students who initially struggled with basic coding gained a deeper understanding after receiving additional explanations and more intensive practice.

Providing additional materials, such as sample problems and practical exercises, also significantly contributed to reinforcing their understanding of applying programming theory in practice. The group-based approach in this activity encouraged students to discuss and share solutions to technical problems they encountered, creating a more interactive and collaborative learning environment.

Thus, despite some initial technical challenges, this community service activity successfully achieved its main objective, which was to improve students' basic programming skills in Turbo Pascal. Students now have a better understanding of using this programming language in the context of Electrical Engineering and are prepared to advance to more complex application development, as well as utilize other more modern programming languages

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