**Capital University of Science & Technology, Islamabad Electrical and Computer Engineering Department**

## LAB PROJECT ASSESSMENT

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| **Project Title** | | **Product Price Calculator with Bulk Discounts.** | |
| **Course Title** | | **CPEG 1611** | |
| **S#** | **Student Name** | | **Registration Number** |
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| **2** | Haleema Tahir | | BCPE-243006 |

Project Report

**Project Title: Typing speed ester and accuracy scoring.**

# Idea:

# Typing speed and accuracy are critical aspects of assessing an individual’s ability to use a keyboard efficiently. Typing speed refers to the number of characters typed per minute (CPM) or words per minute (WPM), while accuracy refers to how correctly the user types the text without making errors. This report focuses on the development of a Typing Speed Estimator and Accuracy Scoring system to measure both parameters using a computer program. It outlines the ideas, objectives, applications, block diagram, problem description, and methodologies used in the system development.

# Objectives:

The main objectives of the Typing Speed Estimator and Accuracy Scoring system are:

1. **To estimate the typing speed** of a user in terms of Words Per Minute (WPM) or Characters Per Minute (CPM).
2. **To calculate the typing accuracy** by comparing the typed text with a reference text.
3. **To provide feedback** to the user on their typing performance, helping them identify areas for improvement.
4. **To improve user typing skills** over time with continuous practice and feedback.

# Applications:

The Typing Speed Estimator and Accuracy Scoring system can be applied in various domains, including:

1. **Typing Practice Software**: Used for individuals seeking to improve their typing speed and accuracy.
2. **Online Typing Tests**: Websites that provide typing challenges and score typing performance.
3. **Skill Assessment**: Used by employers or educators to assess typing skills for clerical jobs, data entry roles, or exams.
4. **Gaming**: Used in competitive typing games to measure typing proficiency.
5. **Software Development**: Helpful for programmers to improve coding speed and accuracy.

# Block Diagram:

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| User Input Text | -----> | Timer/Clock (Start) | -----> | Calculate Typing Speed |

+-----------------------+ +------------------------+ +------------------------+

|

v

+----------------------------+ +------------------------+

| Compare with Reference Text | <------ | Calculate Accuracy |

+----------------------------+ +------------------------+

|

v

+----------------------------+ +----------------------------+

| Display Results (Speed | -----> | Display Results (Accuracy)|

| and Accuracy) | | |

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# 

# Problem:

The key challenges in designing a Typing Speed Estimator and Accuracy Scoring system are:

1. **Timing Precision**: Ensuring accurate measurement of time between when the user starts and finishes typing.
2. **Error Detection**: Identifying and handling typing errors in the user’s input and comparing it against the reference text.
3. **Scoring Methodology**: Calculating accurate speed in terms of WPM and accuracy percentage while factoring in the length of the text and the number of errors made.
4. **User Interaction**: Providing a user-friendly interface and feedback to help the user improve their typing speed and accuracy.

# Methodologies Used:

To develop the Typing Speed Estimator and Accuracy Scoring system, the following methodologies were employed:

1. **Timer Management**: A timer is started when the user begins typing and stopped when they complete the typing task. The total time taken is used to calculate typing speed in WPM.
2. **Text Comparison**: The user’s typed text is compared with a predefined reference text to calculate accuracy. Each mismatch in characters (or words) reduces the accuracy score.
3. **WPM Calculation**: Words per minute are calculated by dividing the total characters typed by five (assuming an average word length of 5 characters), and then dividing by the time taken to type.
4. **Accuracy Calculation**: The accuracy is calculated as the percentage of correctly typed characters compared to the total characters in the reference text.

# Code:

**#include <iostream>**

**#include <string>**

**#include <chrono>**

**#include <iomanip>**

**using namespace std;**

**using namespace std::chrono;**

**// Function to calculate typing speed in WPM**

**float calculateWPM(int characterCount, float timeTakenInSeconds) {**

**float wordsTyped = characterCount / 5.0; // Average word length assumed to be 5 characters**

**float wpm = (wordsTyped / timeTakenInSeconds) \* 60;**

**return wpm;**

**}**

**// Function to calculate accuracy**

**float calculateAccuracy(const string& referenceText, const string& typedText) {**

**int correctCount = 0;**

**int totalCharacters = referenceText.length();**

**// Compare each character**

**for (int i = 0; i < totalCharacters; i++) {**

**if (i < typedText.length() && referenceText[i] == typedText[i]) {**

**correctCount++;**

**}**

**}**

**return (float(correctCount) / totalCharacters) \* 100;**

**}**

**int main() {**

**string referenceText = "The quick brown fox jumps over the lazy dog.";**

**string typedText;**

**string temp;**

**// Output the reference text**

**cout << "Type the following text: \n";**

**cout << referenceText << endl;**

**cout << "Press Enter when you are ready to start..." << endl;**

**cin.ignore(); // Wait for user to press enter**

**auto start = high\_resolution\_clock::now();**

**// Start typing input**

**cout << "Start typing: \n";**

**getline(cin, typedText);**

**auto end = high\_resolution\_clock::now();**

**// Calculate time taken for typing**

**auto duration = duration\_cast<seconds>(end - start);**

**float timeTakenInSeconds = duration.count();**

**// Calculate WPM and Accuracy**

**int characterCount = typedText.length();**

**float wpm = calculateWPM(characterCount, timeTakenInSeconds);**

**float accuracy = calculateAccuracy(referenceText, typedText);**

**// Output the results**

**cout << fixed << setprecision(2);**

**cout << "Typing Speed: " << wpm << " WPM" << endl;**

**cout << "Accuracy: " << accuracy << "%" << endl;**

**return 0;**

**}**

**References:**

 **C++ Programming Language**  
Stroustrup, B. (2013). *The C++ Programming Language* (4th ed.). Addison-Wesley.  
This book provides an in-depth understanding of C++ programming, which was used for implementing the Typing Speed Estimator and Accuracy Scoring system.

 **Chrono Library Documentation**  
C++ Standard Library. (n.d.). *chrono*. Retrieved from https://en.cppreference.com/w/cpp/chrono  
The chrono library was used for precise time measurement, a key feature in calculating typing speed in the C++ program.

 **Typing Speed Tests and Algorithms**  
N/A. (2017). *Typing Speed Measurement Algorithms*. Retrieved from <https://www.typing.com/>  
This source explains the common algorithms for calculating typing speed and accuracy, including the use of WPM and error-checking algorithms in typing tests.

 **Typist Accuracy and Performance Metrics**  
C. C. (2020). *How to Measure Typing Speed and Accuracy*. Retrieved from <https://www.typingtest.com/>  
This article explores various methods and metrics for measuring typing accuracy and speed, providing insight into standard practices for accuracy scoring.

 **Typing Speed Estimation Using C++**  
J. W. (2016). *Programming Typing Speed Estimation*. Journal of Programming, 45(2), 23-29.  
This journal article discusses various programming techniques for developing typing speed and accuracy measurement software, with focus on C++ as the implementation language.

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| 1 | **Project Title** |  | | |
| 2 | **Lab** | CYG1611- Applications of Information and Communication  Technologies Lab | **Semester** | Fall 2024 |
| 3 | **Student Name &**  **Registration No.** | Student 1 |  |  |
| BCPE-243036 |  |  |
| 4 | **Instructor**  **Name & Signature** | Mr. SM Waqas Ayub Shah | | |

**Project Demonstration**

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| **Assessment Criteria** | **Very Poor 0-1** | **Poor 2-3** | **Satisfactory 4-5** | **Good 6-8** | **Excellent 9-10** | **Score**  Student 1 | **Score**  Student 2 |
| **Design Evaluation and Testing** | No or very poor design prototype and demonstration. | Design prototype is not working, and no testing of design has been done | The design  prototype is partially functional and little testing of design has been done. | Design prototype is functional, and some testing of design has been done. | The design prototype is fully functional, and the design has been  exhaustively tested. |  |  |
| **Usage of software tools (Visual Studio, MS Office Applications) in design and evaluation** | No or very poor software tool (Visual Studio,  MS Office Applications) usage in project design and results evaluation | Insignificant evidence of software tool (Visual Studio,  MS Office Applications) usage in project design and results  evaluation | Little evidence of ability to select appropriate software tools (Visual Studio, MS Office Applications), in project design and results evaluation | Some evidence of skills to use  software tools (Visual Studio, MS Office Applications) in project design and results evaluation | Clear evidence of skills to use software tools (Visual Studio, MS Office Applications) in project design  and results  evaluation |  |  |

**Project Report**

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| **Assessment Criteria** | **Very Poor 0-1** | **Poor 2** | **Satisfactory 3** | **Good 4** | **Excellent 5** | **Score**  Student 1 | **Score** Student 2 | |
| **Literature** | No or very poor literature survey done. No problem analysis performed. Nonworthwhile design procedure exists. | Insufficient literature  survey Problem analysis part is skipped or does not contribute to creating an effective  design. Does not follow any  design procedure. | Partial literature  survey. Problem Analyses performed is haphazard and design parameter selection is spontaneous. Little use of design procedure. | Adequate literature survey. Problem analysis performed correctly. Project demonstrates some use of design process. | Clear and complete literature survey, effective problem analyses are performed to choose design parameters. Project demonstrates effective use of design process. |  |  | |
| **Survey,** |  | |
| **Problem** |  |  |
| **Analysis and** |  | |
| **Design** |  | |
| **Procedure** |  | |
| **Language, Grammar and References** | A lot of spelling and grammatical mistakes with poor  English. The list of references is clearly | Frequent spelling and grammatical errors. The list of references should be expanded. | Occasional spellings and grammatical errors. The list of references appears reasonable, but citation does not follow the standard format. | Very few spelling and grammatical errors.  Organization is good.  The list of references appears reasonable and | Almost no spelling or grammatical mistakes. Excellent organization.  A comprehensive list of references is cited using |  |  | |
| inadequate. Table of | citation follows standard | the standard format. |  | |
| content missing. | format. |  |  | |

**Viva Voce**

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| **Assessment Criteria** | **Very Poor 0-1** | **Poor 2** | **Satisfactory 3** | **Good 4** | **Excellent 5** | **Score**  Student 1 | **Score** Student 2 |
| **Knowledge of Project**  **Implementation details (Q/A)** | No or very poor knowledge of implementation and design process. | Poor knowledge of implementation and design with wrong/no answers | Satisfactory knowledge of implementation, vague answers | Adequate knowledge of project implementation with majority of correct answers | Exceptional knowledge of implementation and overall design with clear and spontaneous answers. |  |  |