

TYPERACER – MULTIPLAYER GAME

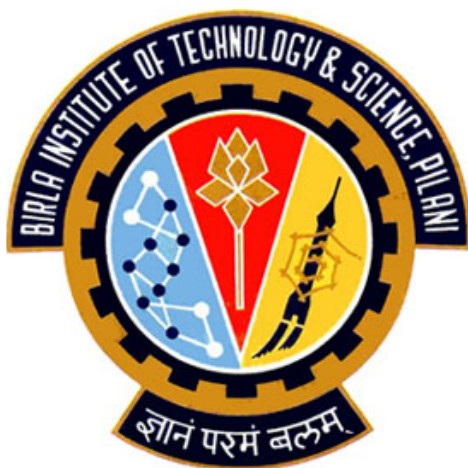
Outline and Plan Document

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**Prepared in partial fulfillment of the course:
CS F303 (COMPUTER NETWORKS)**

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INTRODUCTION

1.1 Problem Definition

The project involves implementation of a 3-level multiplayer networking game, TypeRacer. The game should have a common whiteboard for the users and leaderboard for displaying the game-screen and the scores. The game should be able to concurrently handle all the requests for its users and update the scores accordingly.

1.2 Purpose

The purpose of this document is to present a detailed description of the multiplayer networking game, TypeRacer. It will explain the purpose and features of the game, the interfaces of the game, the constraints under which the game will be played and how it will react to situations of failure, if any. The document is intended for the academic purpose and can be used by the students and faculty members of BITS Pilani.

1.3 Scope

TypeRacer is developed in partial fulfillment of the Mini Project component of CS F303 Computer Networks course. The primary scope of this project is to display the networking concepts learnt during this course and apply them in the game.

The project also includes testing your typing skills in comparison to others for datasets in different languages. The game has 3 levels and can be played in multiplayer mode with a maximum of 5 players connecting to server at any given moment of time.

1.4 Definitions

Term	Description
CPS	Characters per second. It is a measure of typing speed of user.
Data Dictionary	Dictionary of various languages like English, Spanish, Dutch etc. present in the game.
GTK+	Cross platform widget toolkit for creating graphical user interface.
Whiteboard	Screen common to all clients where words appear to fall from top to bottom.
TCP/IP	Transmission Control Protocol/ Internet Protocol
IEEE	Institute of Electrical and Electronics Engineers

1.5 References

- 1) IEEE. (1998). IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society.
- 2) <http://play.TyperRacer.com>
- 3) <https://en.wikipedia.org/wiki/Typing>
- 4) <https://www.speedtypingonline.com/typing-equations>
- 5) <https://unity3d.com/learn/tutorials/topics/multiplayer-networking>

1.6 Overview

This document contains the software specific requirements for the project. It begins with the overall description of the project followed by the product perspective, major functionality and constraints. The software and hardware interfaces are stated in the next section as well. The design model and design constraints are mentioned extensively. The document is finalized with the estimated weekly schedule and module division among the teammates for the project.

OVERALL DESCRIPTION

2.1 Product Perspective

TypeRacer is a multilevel multiplayer networking games involving a common whiteboard for all the clients which is updated by the central server on regular basis. The game involves testing the typing speed of its clients in a funny way where the user need to quickly and correctly type the falling words on the screen. Points are awarded to the user typing the falling word correctly, after which the word disappears from the screen. There is also a bottom-line after which no user can try to gain point by writing that word i.e. the word appears on the whiteboard only for a specific time interval. There are 3 levels in the game which are played for a specific interval of time. After each level, the player with the lowest score gets eliminated while others advance to the next level. In case of ties in score, the winner is decided on the basis of characters per second written by him. To make the game more interesting, users can chose among the dictionaries of different languages present in the database before starting each level. In case of no majority while selecting the dictionary for a particular level, the server randomly picks one for the clients.

2.1.1. System Interfaces

The systems should have Linux or Mac operating system installed on them. Since, the game is multiplayer every machine should be able to connect to the server in the network.

2.1.2. User Interface

The user interface just consists of the terminal in the operating system. The game has minimal GUI so as to support fast exchange of the data over the network between the server and its client. The whiteboard where the words appear falling from top to bottom, is common to all the clients and is handled by the server. Additionally, “Leaderboard”, showing the current score of the user and its “characters per second” count is displayed for all the users.

2.1.3. Hardware Requirements

Our project currently can be played only on desktops, laptops, and palmtops but not on mobile phones. Since the mode of the game is multiplayer, there should be a smooth network connection between the server and its clients.

2.1.4. Software Requirements

The game will work on Linux and Mac Operating Systems. The graphical user interface of the game will be the terminal only. GCC compilers should be installed on all the machines, along with GTK.

2.1.5. Memory Requirements

The major memory requirement would be just to hold the words in the dictionary efficiently. This will be kept at their server side only. So, it is required that server has atleast 2GB of RAM.

2.1.6. Site Adaptation Requirements

There will be no site based Adaption requirements for this project.

2.2. User characteristics

The user should be familiar with the usage of terminal in Linux or Mac operating system. He should have some basic knowledge of compilation of C programs and changing IP addresses in code to be able to connect to different server.

2.3. Constraints

This game is to be played in a Linux or Mac operating system's terminal. Hence constraint of Operating System applies. For multiplayer mode, each player should be connected with each other on a TCP/IP network. This is a server-client based game; hence one of the nodes will have to act as a server. All the remaining nodes will be clients and they would have to connect with the server. There is also a limit of maximum 5 players connecting to the server at any moment of time.

2.4. Assumptions and Dependencies

We assume that GCC, along with GTK library support, would be installed in all the machines on which the game is going to be played. We also assume that the players take care of the above mentioned constraints before playing the game.

SPECIFIC REQUIREMENTS

3.1 Interface Requirements

The detailed interface description is given in Section 2.1, 2.3 and 2.4.

3.2. Performance Requirements

For the best gameplay experience, the latency of each player's connection should be less than 100ms as the average keystroke time lies between 50ms-100ms.

(SRC : <http://www.cs.cmu.edu/~keystroke/>)

3.3. Design Constraints

3.3.1 Security and Privacy

Players may not want to share their personal data without their permission. This has to be taken care of Prevention of cheating has to be prevented to the maximum extent.

3.3.2 Usability

The game is playable by anyone who can type on a keyboard. The usability will not be an issue here.

3.3.3 Availability

The game is made for academic purpose and is available for the students and faculty members of BITS, Pilani.

3.3.4 Portability

The game requires minimum effort in terms of installation. Also, it should work on any platform mentioned in section 2.3 and 2.4.

PLANNING

4.1 Modules and Leadership Details

Module Name	Module Leader
Menu model	Harshid Wasekar
List of Dictionaries	Junaidul Islam Bhat
Network- Server	Bhuvnesh Jain
Network- Client	Shubham Nagaria
Graphics	Junaidul Islam Bhat
Game Logic	Harshid Wasekar
Integration	Shubham Nagaria
Failure and Recovery Handling	Bhuvnesh Jain

4.2 Weekly Schedule

Week Number (Dates)	Modules/ Modules covered
1 (12 th – 18 th March)	Menu Model & List of Dictionaries
2 (19 th – 25 th March)	Game Logic
3 (26 th – 31 st March)	Server & Client
4 (2 nd April – 8 th April)	Graphics + Server and Client (Contd.)
5 (9 th – 15 th April)	Integration, Additional features (optional) & Failure & Recovery handling
6 (16 th – 22 nd April)	Final Testing and Submission