**Title of the Paper   
Subtitle of the Paper**

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**Matura Paper, Kantonsschule Sargans**

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# Preface

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# Introduction

## Objectives and Guiding Questions

## Procedure and Method

## Structure of the Paper

# Initial Chess Code

## Logic of initial chess code

### Overview

### Concept

#### Figure

#### Position

The position of the buttons and the chess pieces have a separate grid to arrange them. The grid for the buttons ranges from row and column one to eight. Whereas the grid arranging the pieces range from row and column zero to seven. This is because computers start counting from zero. So, when comparing the two grids, we must subtract one from the grid of the buttons to correspond to the grid utilized by the pieces.

A screenshot of a game

Description automatically generated

Figure 1 This is the grid used by the buttons.

#### A game of chess with a checkerboard and chess pieces Description automatically generated

Figure 2 This is the grid used by the pieces.

In the code the chess pieces are stored as individual objects of the Figure class. If we want to interact with the piece, we must call them by their name. The pieces are named the following way.

#### A green and white checkered board with numbers and letters Description automatically generated

Figure 3 The pieces are named this way.

#### Chessboard

#### Turn

In the game of chess, each player makes the move one after the other.

Turn is a variable that the program uses to determine which player is making the next move. This variable is important to check whether the move played is legitimate. The turn variable can be set to “W” (for white) or “B” (for black). If a legit move has been played, the Turn must change to the other value. If the player does not make a valid move, the program must not change the value of this variable.

#### Control Flow

#### Error Handling

A well-written code must deal with its errors. If an error occurs, the program freezes and the user can no longer interact with it. This leaves the user with no idea what caused the problem. To prevent this, the original chess code introduces a variable called “error”. This variable is used to tell the user what problem occurred while interacting with the program. The program continues to run and since the user is informed about the problem, he can avoid it. The error variable can be equal to four values.

If the error is set to "1", the provided move was invalid.

When the error equals “2”, the game is over.

In the case where the error is “3”, the king is in check.

Should the error be equal to “4”, there is a checkmate.

## GUI

### Overview

Tkinter

### Visualization Chess Pieces

### Visualization Chessboard

### Update Game after a move

## Function catalog

# Color Chess

# Chaotic Chess

## Rules of Chaotic Chess

### Barrier

### Shield

### Coin

### Bomb

## Implementation of Chaotic Chess

### Overview

#### Modules

#### Differences In Chess Code

#### Usage Of Initial Chess Code

### Barrier

### Shield

### Coin

### Bomb

# Summary

# Bibliography

Bonati, P., & Hadorn, R. (2009). *Matura- und andere selbständige Arbeiten betreuen* (2. Auflage ed.). Bern: Heb Verlag AG.

Metzger, P. (2010). *Abschlussarbeiten.* Aarau: Sauerländer.

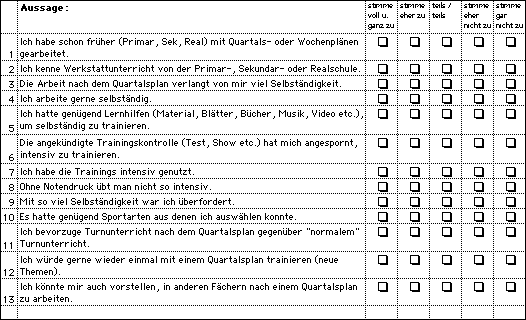
*Panorama*. (2015, December 15). Retrieved December 6, 2019, from Statistik Schweiz - Panorama: http://www.bfs.admin.ch/bfs/portal/de/index/themen/01/01/pan.html

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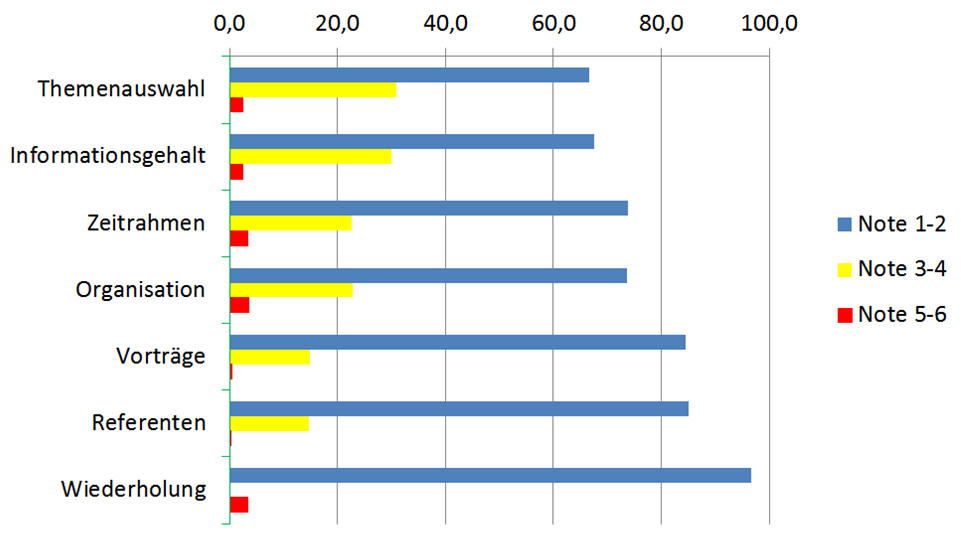
[Figure 1: Demographics of Switzerland in 1900 and 2014 3](file:///D:/Sargans%202016-2017/3-Info/9)%20Maturavorlage%20erstellen/Kurs%20MA-Vorlage%20Reuteler/Vorlage%20Maturaarbeit%20Englisch.docx#_Toc454176099)

# Appendix

## Appendix 1

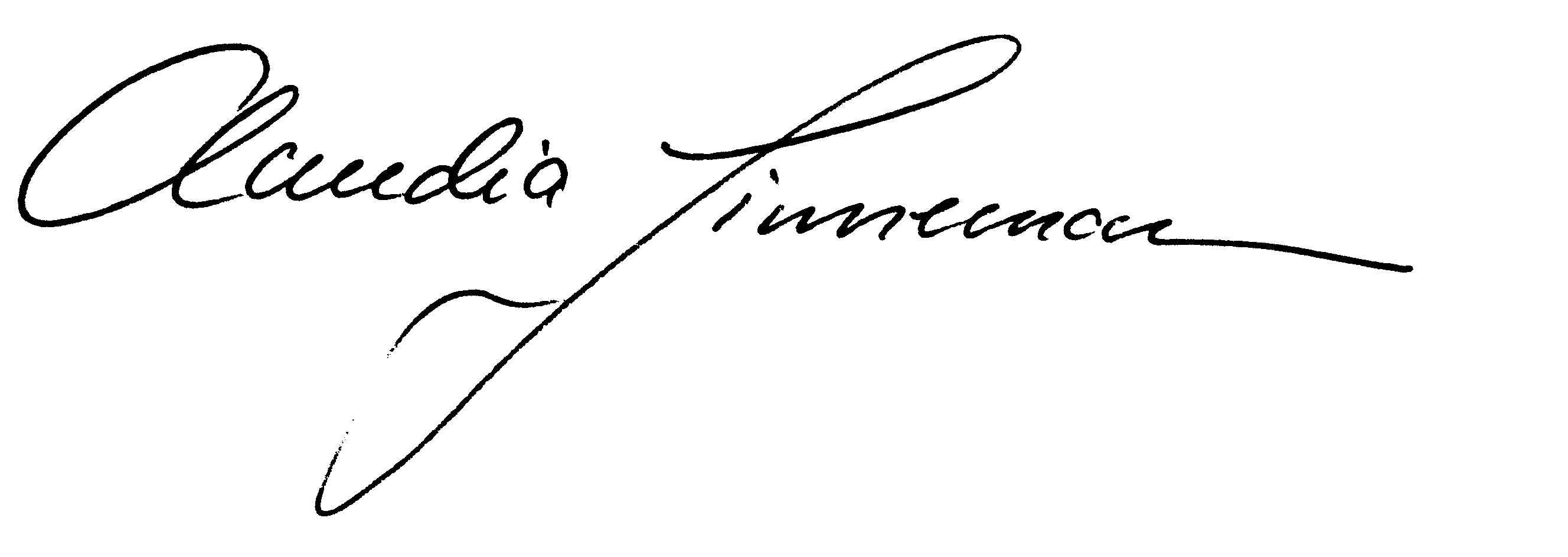


## Appendix 2



## Declaration of Authenticity

I hereby declare that the work submitted is my own and that all passages and ideas that are not mine have been fully and properly acknowledged.



Mels, 6.1.2020