

# “History of Applied Computer Science”

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## 1 Introduction

*“Computer Science is no more about computers than astronomy is about telescopes”*  
(Edsger Dijkstra)

This paper is supposed to give a brief overview about *The History of Applied Computer Science*. Despite my research on the concept, I was not able to find much appropriate literature covering the subject. The term *Applied Computer Science* is rather artificial and therefore not officially defined.

On the following pages I will try to clarify the subject myself. After discussing the question “What is Applied Computer Science” by defining the term and giving a small history

insight, the next Section presents several applications. At the end some concluding remarks are given.

## 2 What is Applied Computer Science

This section is concerned with the definition and a more general history insight.

### 2.1 Definition

Wikipedia says:

*Applied computer science aims at identifying certain computer science concepts that can be used directly in solving real world problems.* [1]

Computer science technology is used to solve problems in several disciplines, as for example education, industry, scientific research, politics or the environment. An employee working in this field uses a variety of skills, such as programming, software engineering, database management or graphic arts to create an environment for storing, analyzing and collecting information that helps resolving problems. It also helps simplifying and accelerating work processes.

### 2.2 History

The fundamental mathematical principles of computing were developed by Turing and Church in the 1930s, followed by early computers implemented by Wilkes, Eckert, von Neumann and others. This progress led to the beginning of commercial computing in the 1950s. After rapid development in subjects of algorithms, databases and operating systems the personal computer comes up in the 1980s, followed by the internet a few years later. [2]

With these technical achievements, especially the personal computer, many new possibilities have opened up. Everyone is able to buy a PC and can start writing programs which leads to fast development in things like software and operating systems. Shortly after the release of MS-DOS in 1981, Autodesk launches the first version of AutoCAD and changes the life of every engineer and architect. A few years later MS-Excel and -Works find their way into our offices. [3] Today there is software available nearly for every purpose to simplify our work and even for our free time management.

## 3 Applications

This section will present several applications of computer science and some partial history insights.

### 3.1 Cryptography

Probably one of the most famous examples in history of Cryptography is the decryption of the german encryption machine called *Enigma* during World War II. It was considered as not crackable but with the help of a computer-like machine constructed by Alan Turing, the Allied Forces were able to crack it, monitor german radio messages and win the war. [4] Modern Cryptography is based on mathematical theory and computer science practice and its goal is to develop systems for encoding/decoding informations that are as secure as possible against any third party.

### 3.2 Databases

Paper files or punch cards, the materially organized files were hard to manage, especially retrieving information was really slow. Computer science had a big impact here with digital database management systems. By means of that, users were able to handle vast quantities of data easily. These management systems took care of the complete storage and access processes, so that users didn't need to know anymore *how* the data was stored.

### 3.3 Medical Informatics

Electronic data processing is very important for all medical facilities to keep the huge amount of medical data manageable. Imagine a normal sized hospital still using a card index for storing the patients data, that would be nearly impossible to manage. Digital management of patient files makes it easy to keep track, manage, maintain or search the saved information. Also, these databases represent a huge knowledge-based System, which helps healthcare professionals in diagnosis and therapy, for example by analyzing disease patterns or dependencies. There are other medical fields where computer science had influence on as well. For example computer tomography, computer assisted surgery, 3D x-ray systems or bio signal processing. [5]

### 3.4 Computer Graphics

First computers with displays came up in the 1950s but due to poor computing power it was not possible to create graphics on a PC until the 1980s. This field is now concerned with creating digital graphics and 2-/3-dimensional models as well as animating those. [6] Important applications are graphical-user-interfaces, image processing, computer-animated films, computer-aided design (CAD) and computer games.

## 4 Summary and Conclusions

Computer science applied to different fields is considerably valuable to all of those fields. Actually everybody uses computer science in any form and we can not imagine how a world without computers would work nowadays, it has become part of us and we take it for granted.

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