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**Department of
Computer Science**

PROJECT
APLAI (H02A8a) – Part 2b

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1 Task 1: Sudoku

1.1 Viewpoint

In this section we will discuss an alternative viewpoint to the original Sudoku problem in which differs from the classical viewpoint. The classical viewpoint for Sudoku states that all numbers in a row must be different, that all numbers in a column must be different, and that all numbers in a block must be different. We can define the Sudoku problem as follows:

$$\textbf{Variables: } x_{1,1}, x_{1,2}, \cdots, x_{i,i}, x_{i,i+1}, \cdots, x_{x,x} \in [1, 2, \cdots, n]$$
$$\textbf{Constraints: } \bigwedge_{i=1}^{n} \bigwedge_{j=1}^{n} \bigwedge_{k=1}^{n} x_{i,j} \neq x_{i,k}$$

Another way to look at the problem is to group all numbers in a collumn together in a list. Now we can define an entire collumn at once as a permutation on the sequential list of the entire domain. By doing so the constraint that all elements in a certain collumn must be different is already satisfied from the beginning.

1.1.1

2 Introduction

The goal of this project is to design an architecture for a smart home system. Smart home systems provide home automation, which is the use and control of home appliances remotely or automatically. This system improves convenience, comfort, energy efficiency and security for the user. The system consists of a smart home gateway and an online system. The smart home gateway can communicate with plug-and-play sensors and actuators, which are spread around the home of the user. The online system will communicate with the gateway to make sure that any information is synchronized and properly processed.

The points of differentiation from existing technology providers will be twofold. Firstly, as the HomeSys gateway will feature a 3G communication module, it will will be 100% plug-and-play, i.e. not requiring any pre-existing infrastructure. Secondly, the gateway will be designed with explicit focus on flexibility, hereby allowing the development and integration of new smart-home end-to-end applications, perhaps even allowing third party applications.