

# Self Learning Game Playing System

## Abstract

A software package that can learn about and respond according to its environment has potential uses in a variety of products. Through learning, a general system could theoretically conform to the needs of many specific applications.

Existing game playing systems tend to be algorithmic in nature, with hard coded rules and strategies. These systems are designed to play one specific game and must be largely rebuilt for each new game. In this project, we develop a general system that learns the strategies for a variety of card games, specifically Poker and Golf.

Our learning system consists of two main components: a learning component that uses **Artificial Neural Networks** in conjunction with **Genetic Algorithms**, and a main component that governs the learning process in accordance with the game definitions. The result is that our system can learn to play Poker and Golf better than a player who acts at random.

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## Demo Times:

11:00 – 12:00

1:30 – 2:30

April 18, 2006

## Learning System

### Theoretical Background

#### Artificial Neural Networks (ANN'S)

An Artificial Neural Network is a group of interconnected states that carries out a complex transformation of the network inputs to acquire a set of outputs.

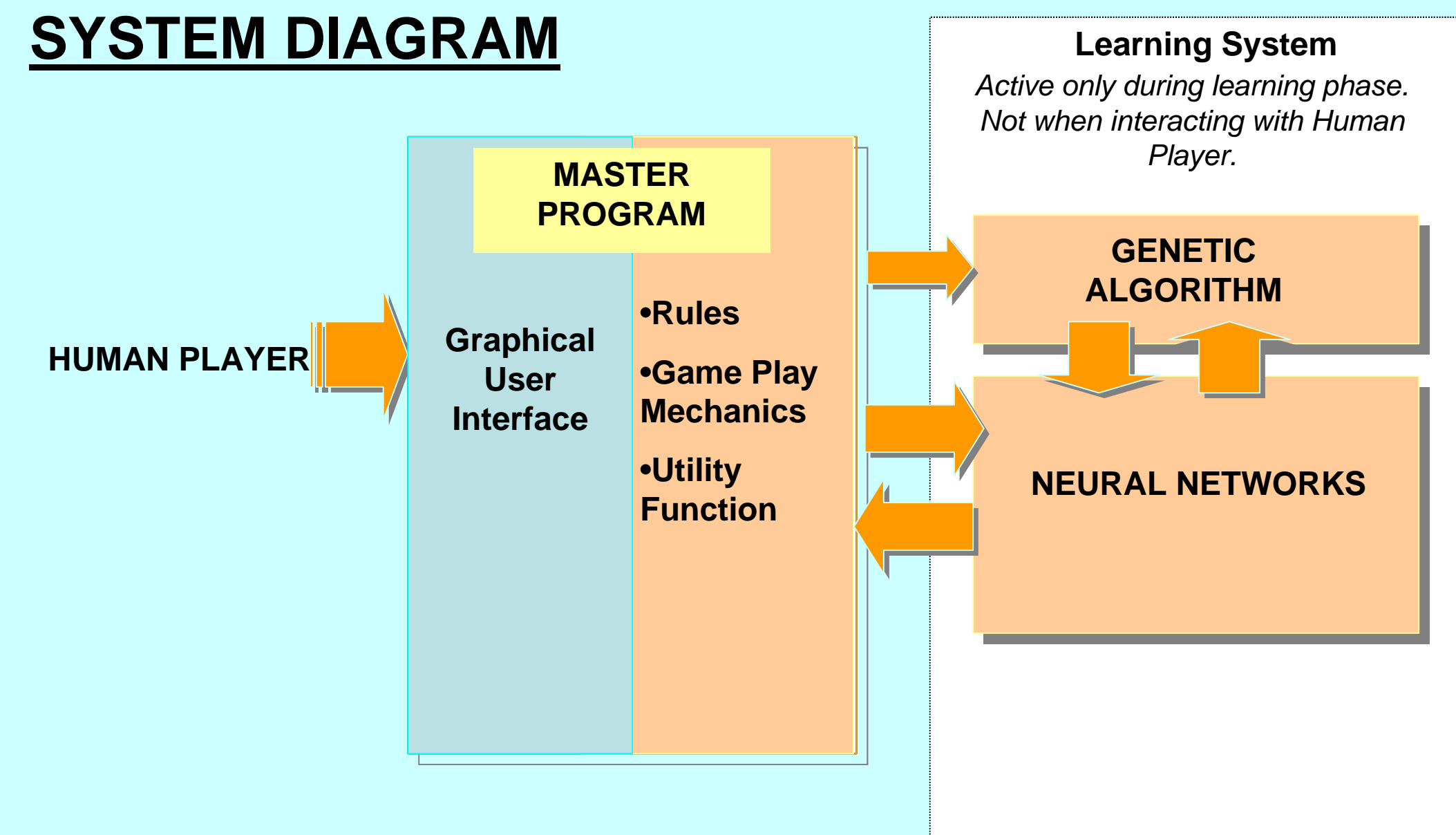
#### Genetic Algorithms (GA's)

Genetic Algorithms create new Artificial Neural Networks by combining features of previously existing networks.

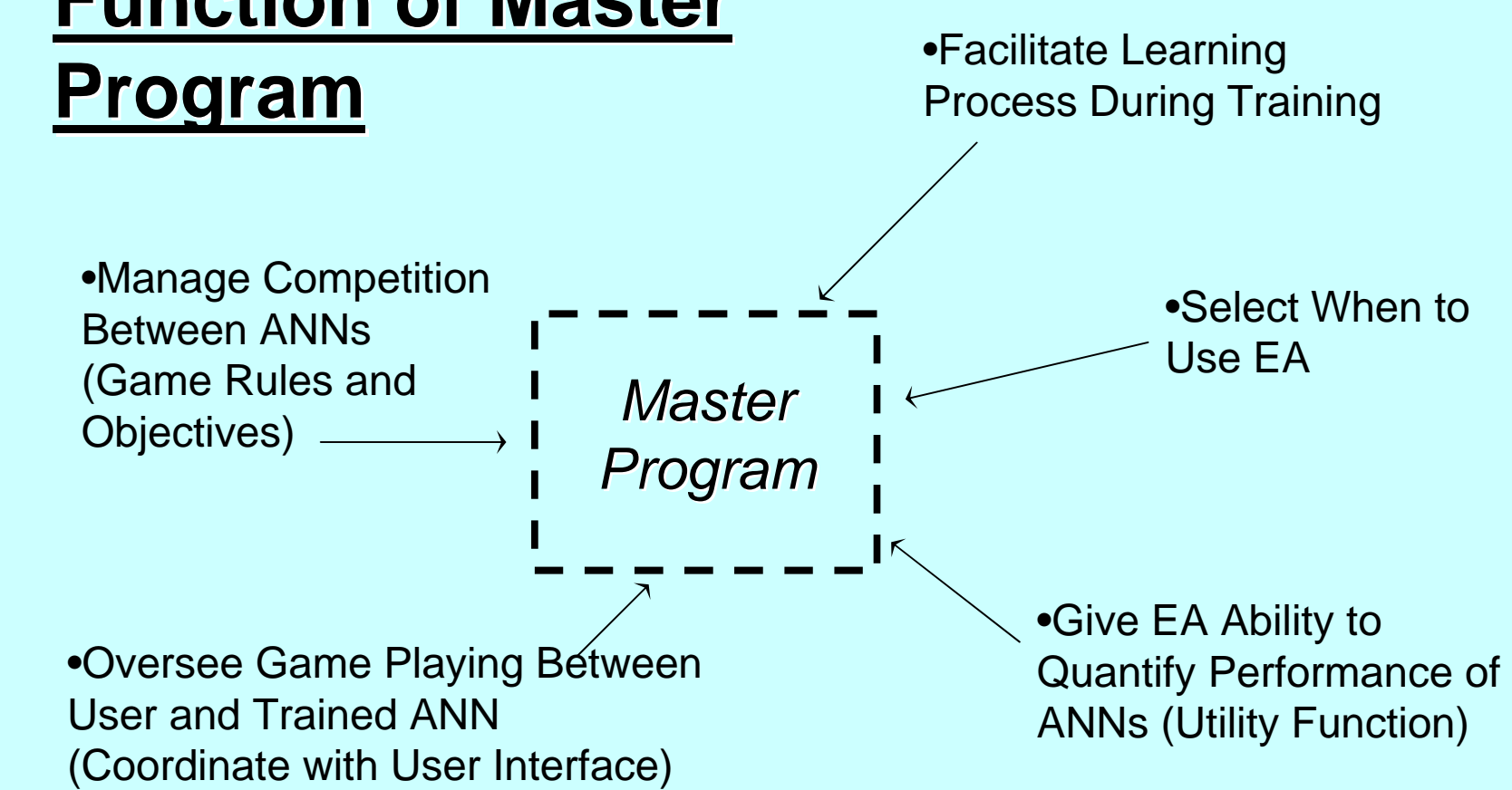
#### GA's, ANN's and Learning

Our system learns to play card games using a combination of Artificial Neural Networks and Genetic Algorithms. An initial population of neural networks is created randomly. These networks play against each other and are judged by the master program. The successful networks are taken by the Genetic Algorithms to produce a new population of neural networks. This process is repeated for several generations. Over time, the Artificial Neural Networks become better at playing cards.

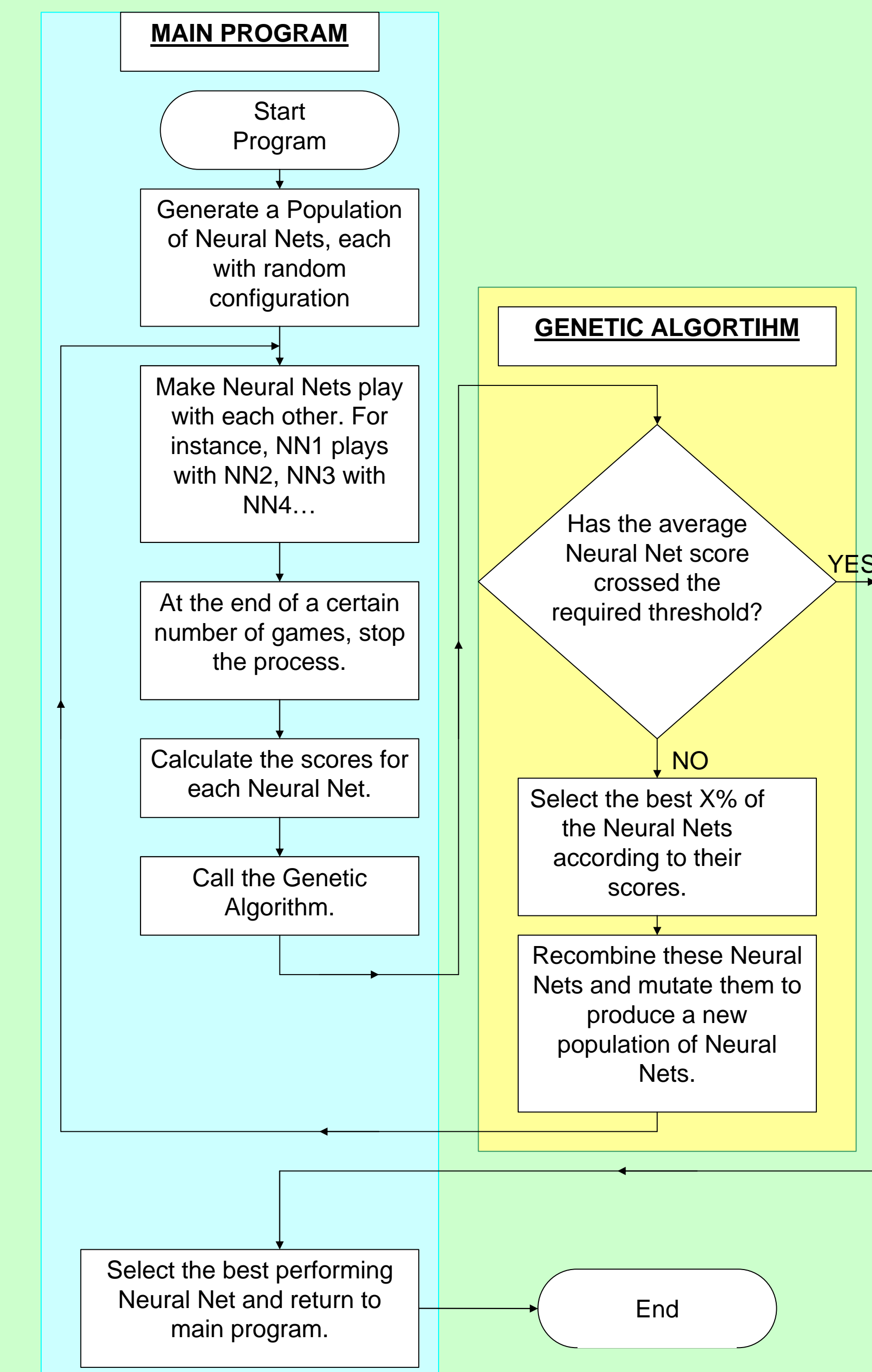
### SYSTEM DIAGRAM



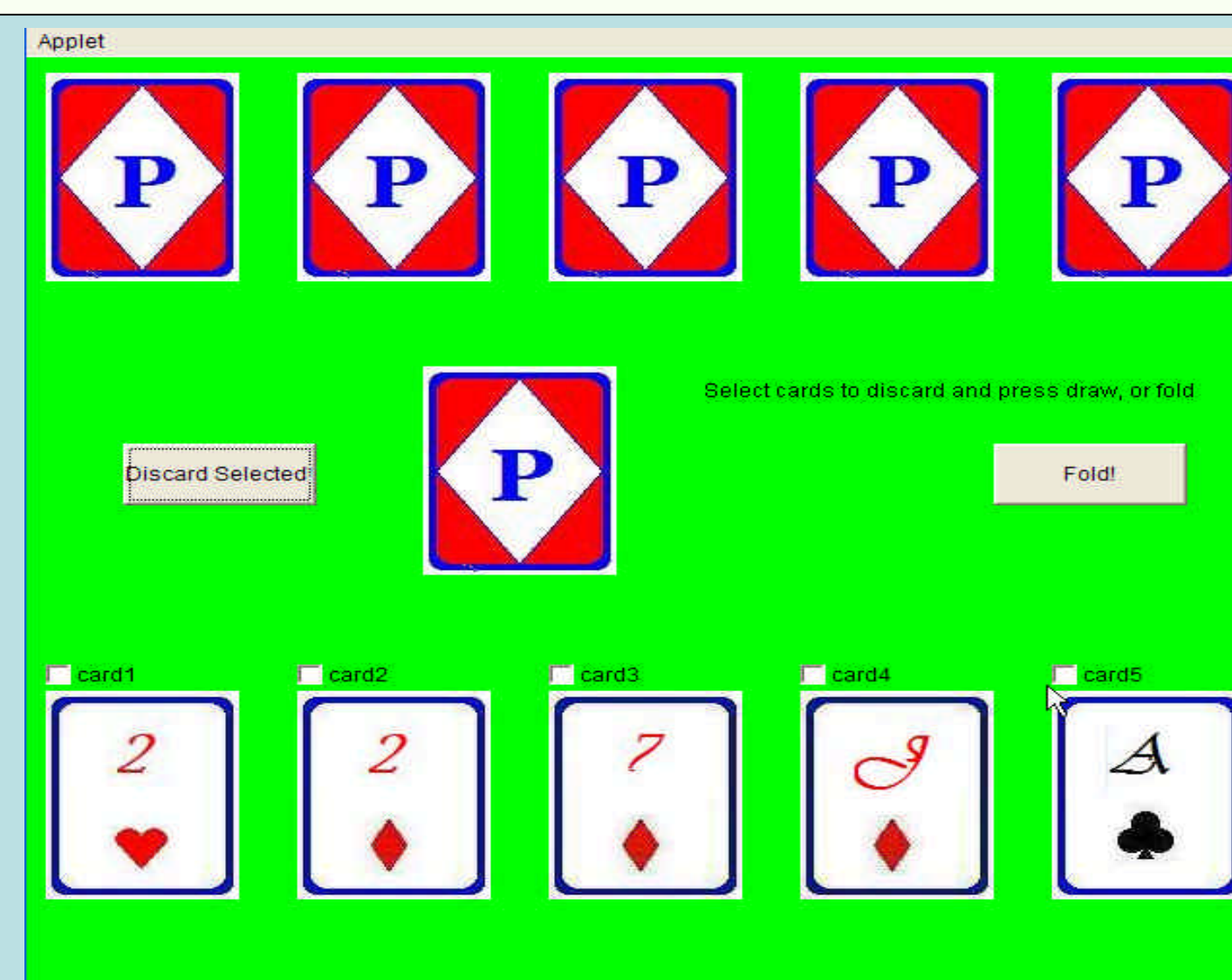
### Function of Master Program



## Process Flowchart



## GRAPHICAL USER INTERFACE



Moore School of Electrical Engineering