4/22/87

Dear Oliver -

Here are the printouts of the screens that I mentioned. I've included some comments on the functioning of certain aspects, if you have any questions, call me.

As for meeting me this evening, you can try and reach me at my home number 225-6527. I'll leave a message on my answering machine if I go somewhere.

Andy Gerber

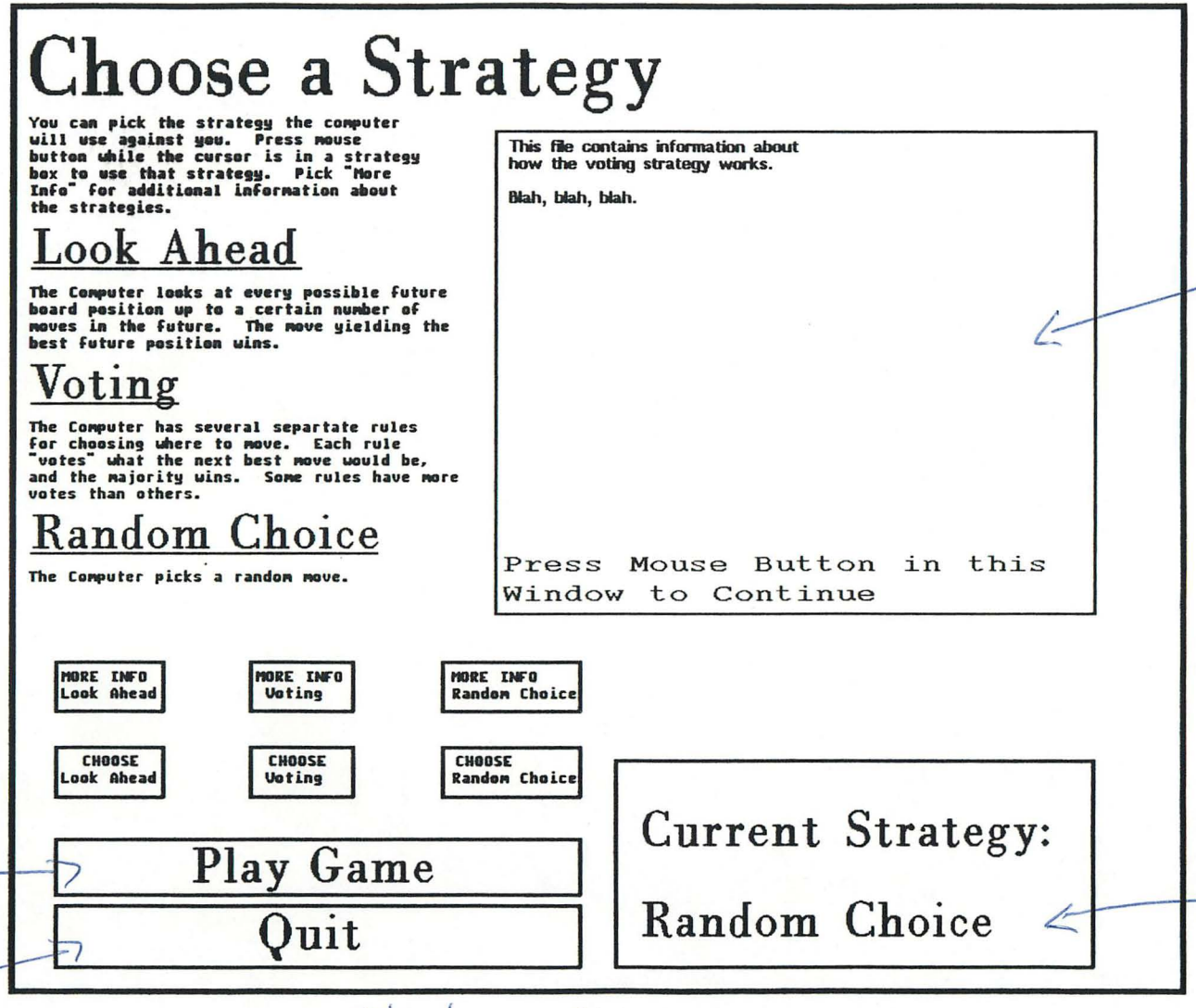
P.S. The actual size of the windows is much larger on the display.

How do Computers Play Games?

In this exhibit, you can learn how computers play games. Choose a strategy for the computer and then challenge the computer to a game of tic tac toe and five in a row.

Press Mouse Button to Continue

Introduction Screen



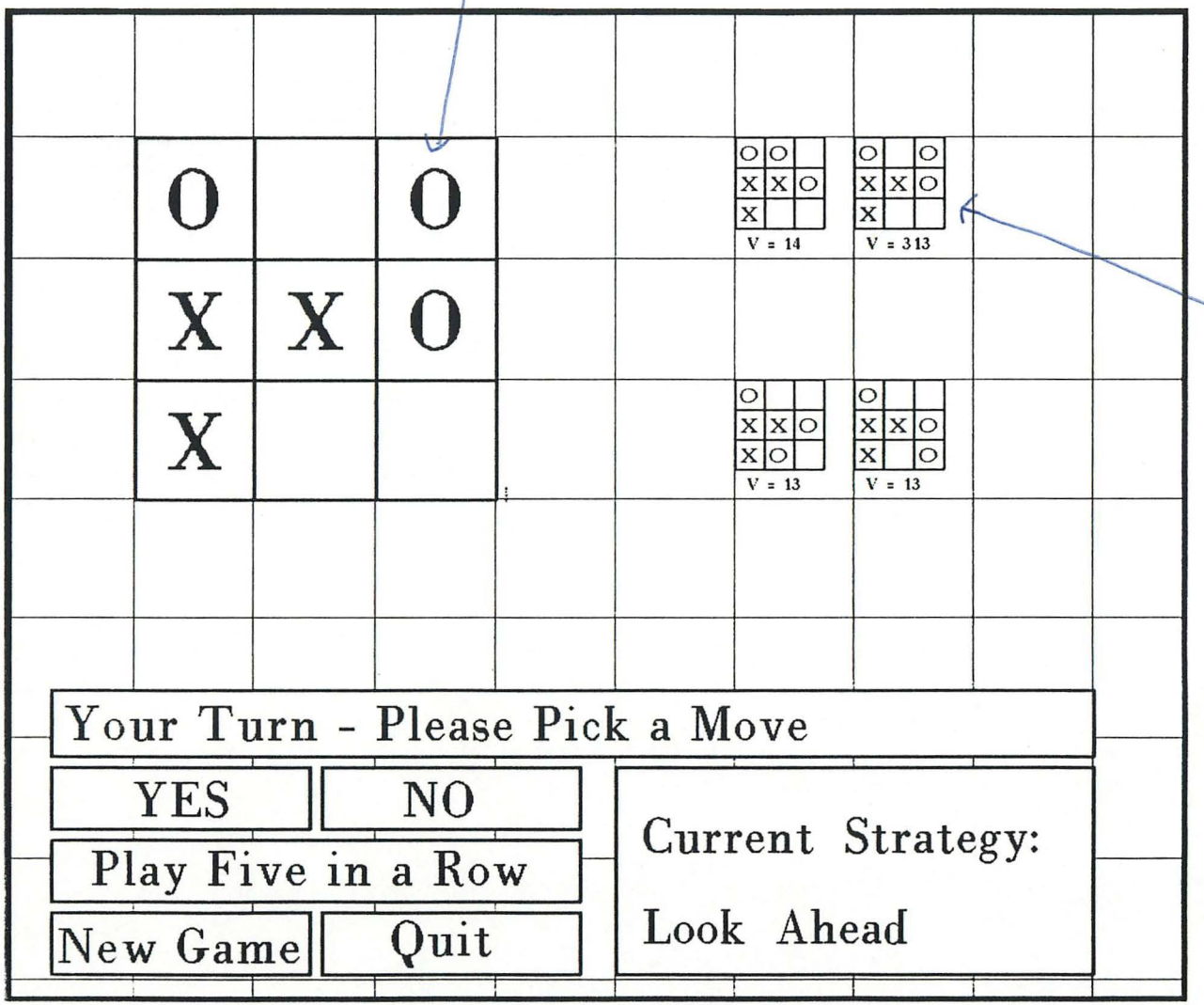
Move Info window pops up when "Move Info" is selected.

Begins Tic-Tac-Toe

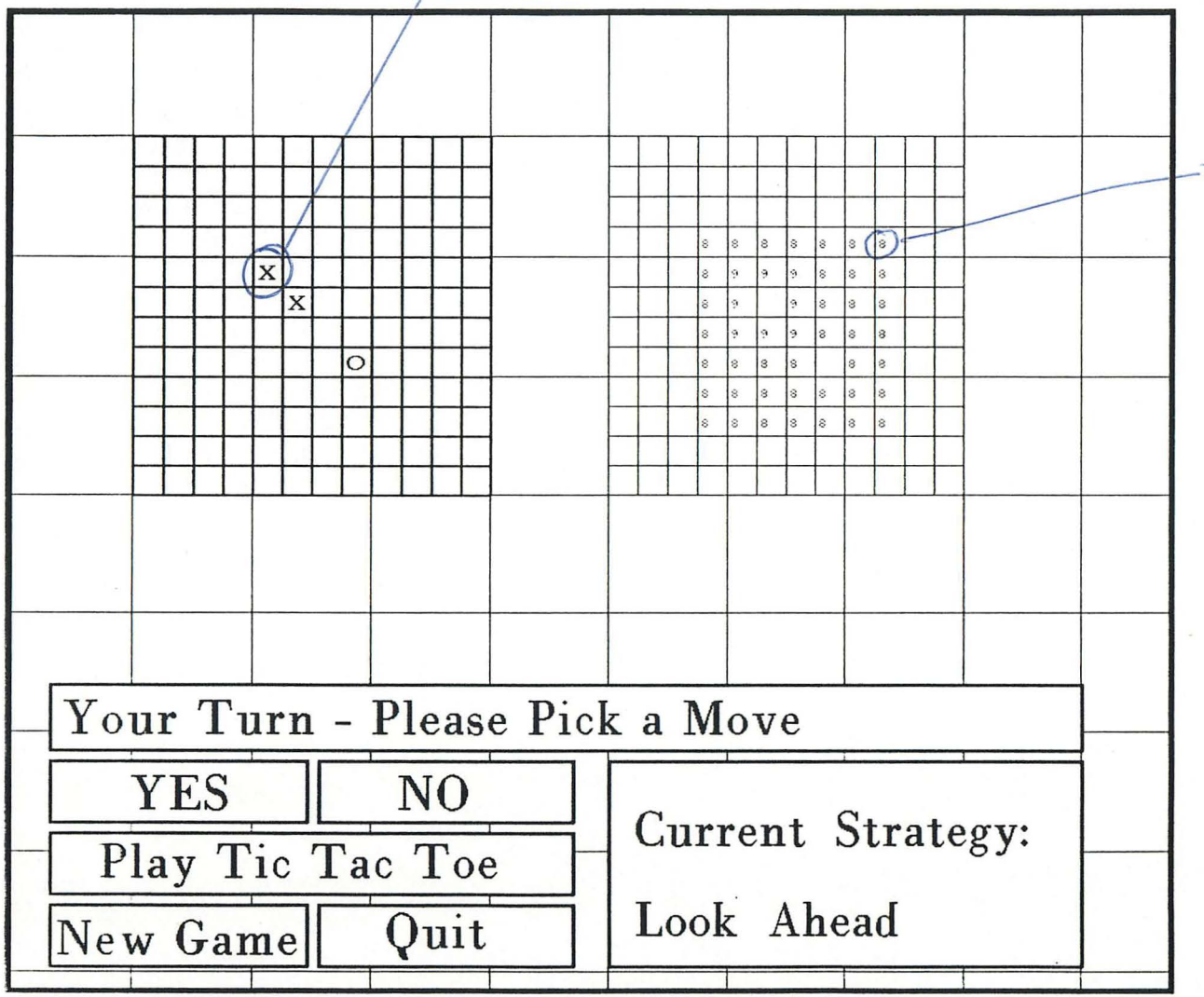
Goes to Final Screen

changes when "Choose Strategy" is chosen

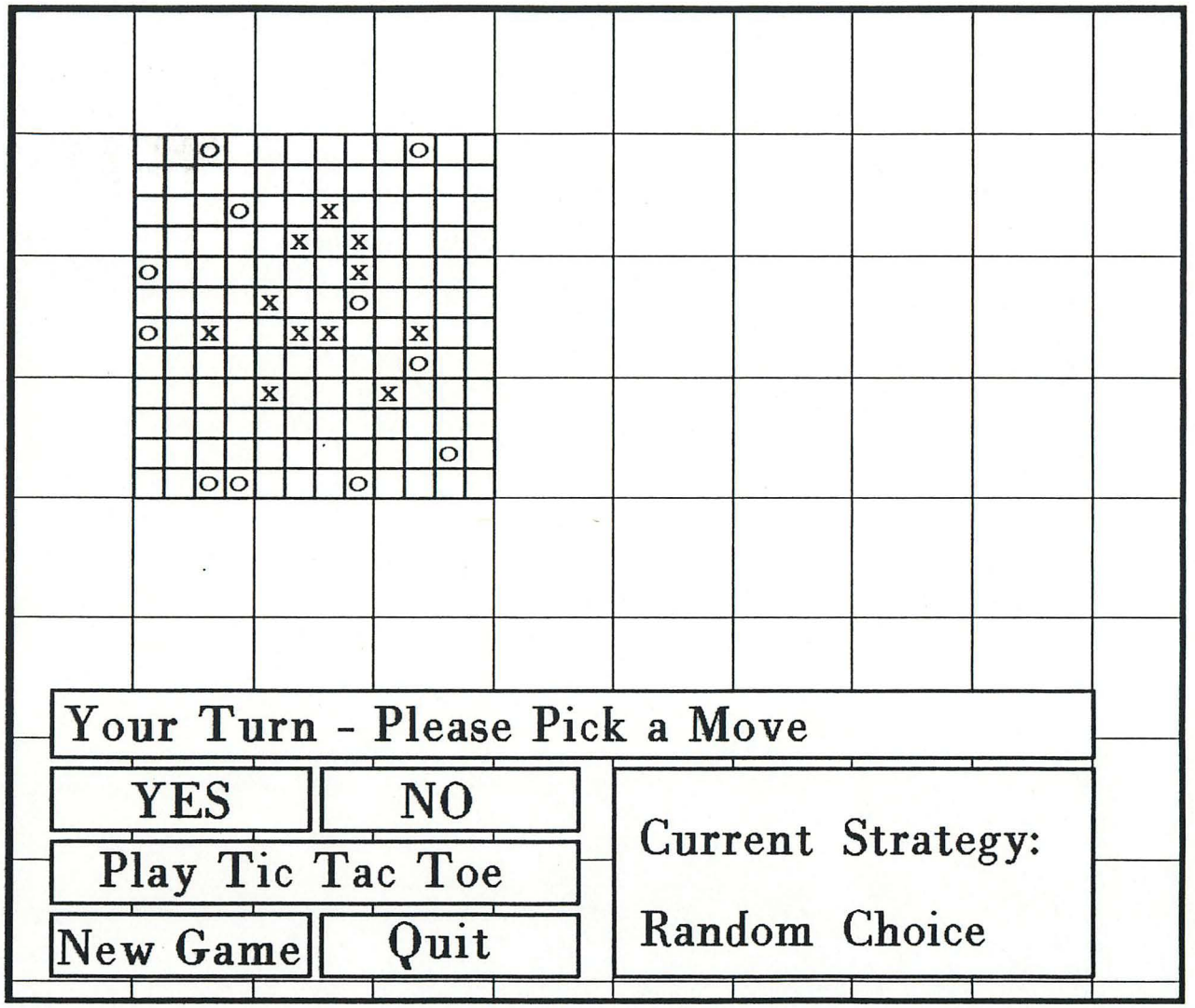
Strategy Screen



Tic Tac Toe Screen



Pente Screen



Another view of the Pente screen

Thank You for Playing

Please let someone else try now!

Press Mouse Button to Restart

Final Screen

Thesis Title:

Design and Programming of a Interactive Exhibit for Museum Use.

Text of Thesis Proposal

For my thesis project I will design and program an exhibit display for the Computer Museum in Boston, MA. The exhibit will illustrate how computers are programmed to play games and will be part of an A.I./Robotics gallery. Project will include research into game-playing techniques, design of interactive program, programming, debugging, testing of exhibit code, and writing text displayed with exhibit.

The program itself will be an interactive game-playing tutorial. Visitors will play a simple tic-tac-toe game against the computer, and then go on to play a more complicated version of tic-tac-toe. This more complicated version uses a 19x19 board and to win the player must get five tokens in a row. The computer will use different strategic methods for each successive game. Visitors will learn about the various advantages and disadvantages of each method as they play against the computer.

I expect the thesis itself to focus on three major areas: exhibit design, program design, and strategic methods for simple game playing. Exhibit design is concerned with issues relating to a museum display, such as the user interface and interaction times. The program design is the basis behind the design of the modules and code of the program. The strategic methods are the various techniques which the computer can use to play its side of the game.

Target Audience:

Visitors to the Computer Musuem come in two flavors: adults and children. Therefore, the exhibit has two target audiences, and must be able to entertain and educate on two levels. Although many adult visitors to the Computer Musuem are computer literate, the exhibit will assume only the most basic understanding of computers, one that might be achieved by walking through the musuem's other gallerys.

The exhibit will entertain and educate children by playing a game simple enough to be understood by a young visitor to the musuem. Explanation of the strategic reasoning behind a move by the computer will not interfere with the actual playing of the game. Graphic representation of the computer's thought process will help illustrate the method the computer uses to make moves.

More sophisticated visitors will find the game simple to play, but will be enlightened by seeing the graphic representation of the computer's thought processes.

Choice of Game

The two games which will work best in this exhibit are tic-tac-toe and Pente. Pente is very similar to tic-tac-toe, except it is played on a 19x19 board, and it takes 5 pieces in a row to win. Tic-tac-toe is simple enough to be understood and recognized by everyone. Tic-tac-toe has an average playing time of 1-2 minutes, and Pente games can take anywhere from 2 minutes to 10 minutes. It it important that the games chosen to be used in the exhibit can be completed in a reasonable amount of time.

Choice of Strategy

In the initial implementation of this exhibit, two different strategies will be presented. After the initial implementation, if time permits, more strategies will be included. The two strategies that will be implemented first will be recursive search with positional evaluation, where the computer anaylyses future moves, assigning a value to each one, and bases a move on that data, and table lookup, where the computer has a table of all possible moves, and bases the move on information from the table.

If possible, I would like to add additional strategies to the computer's repertoire. Voting would be a good addition, as would be random playing. Goal Stacking is worth looking into. If the machine we use is fast enough, vastly different levels of recursive search with positional evaluation will be possible.

Sample Interaction

Here is an outline of a typical interaction between a user and the exhibit. The mode of input is dependant on the target machine, and is therefore not yet determined. The user will be presented with an offer to play tic-tac-toe, and to choose a strategy for the computer to use.

The user will then play a game of tic-tac-toe against the machine. Whether or not the computer wins or loses, the user will be challenged to a game of Pente after the tic-tac-toe game. Again the user will be able to pick a strategy for the computer to use. After the completion of the game of Pente, the program will cycle back to

the inital display.

In all situations where an input is expected, a timeout will send the program back to its initial state if input is not presented within an adequate amount of time. This length of time will not be so short as to interfere with useage even by the users slowest to respond.

The screen display will contain 3 main windows. (see diagram). The first window, "A" on diagram, will contain the playing board. The second window, "B" on diagram, will contain graphic representation of the computer's thoughts. The way these thoughts are presented will differ with the different strategic methods used. Table lookup might show the computer paging through different boards to find the correct move, and recursive search might show each board as the computer evaluates it.

The third window will contain messages from the game. Explanations such as "thinking...." or "your move." will go here.

Things still to be thought about

Backdrop text. I think we can wait a bit on this until we are aware of the machine we will use and the amount of space available.

Input Method. Machine-dependant.

Machine to use.

A

Playing Field Display

B

Graphic Representation of
Computer Thought Process

C

Prompts, Queries, Descriptors

Andy Gerber

Schedule :

Mid Feb : Commit to Machine - SUN-3 (Preferred) Lovish Screen? OK - come over here.

or IBM PC/AT + EGA

19 Feb

Specification :

1 Mar Implementation Draft

← Need computer here.

1 April Program working

Debugging

1 May Program complete

22 May Thesis due - write-up complete

Account on VAX

Card on Elevate.