CHECKERBOARD TRAILS

This edition of Focus Media's *Checkerboard Trails* was designed especially for the Hesa Educational Software Library. Focus Media's programs have received many excellent reviews and have won numerous national educational awards. *Checkerboard Trails* won a 1988-89 *Classroom Computer Learning* Software Award of Excellence.

Focus Media has been supplying schools with high quality software and audiovisuals since 1979. The company is especially known for its strong line of science, social studies, language arts, and math titles both on the elementary and secondary levels.

Focus Media is especially proud to be part of the Hesa Educational Software Library, and we congratulate you on your participation in this fine program.

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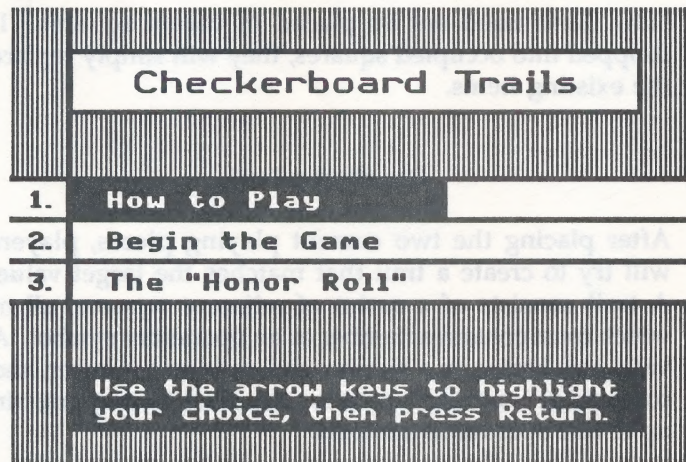### Authors/Editors
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Introduction

Checkerboard Trails is a challenging mathematical logic game for ages 8 to adult. It provides valuable exercises in mathematical concepts, problem solving, and higher-level thinking skills within a highly captivating game. The game can be played by one person or as many as six people. Players can work together as a team or compete against other players. Children will love playing *Checkerboard Trails*, improving their math skills in the process.

The object of the game is to gain as many points as possible by creating an arithmetic expression that matches (equals) a given target value. The longer the expression, the more points gained. The game is played on a checkerboard-like field, with numbers on the white squares and operation symbols on the black squares. Easy-to-follow instructions appear on the screen at certain points in the program.

About the Game

After you have booted the *Checkerboard Trials* disk, you will be taken to the following menu:

```
         Checkerboard Trails


  1.  How to Play
  2.  Begin the Game
  3.  The "Honor Roll"

    Use the arrow keys to highlight
    your choice, then press Return.
```

The first option on the main menu, How to Play, is a brief introduction to the game. It explains the object of the game and how the game is played. Additional instruction, is possible at any time during the game by pressing the "?" key.

The second option, Begin the Game, takes you through a brief section in which you make several decisions about how you want to play and then on to the game itself.

The third option, The "Honor Roll," displays the names of the people who have earned the ten highest scores.

Game Options

The Begin the Game option presents users with several decisions regarding the number of players, grouping of the players (there is an option for team play), math content, and level of difficulty.

First, the number of players must be chosen and the name of each player entered. When using the game with more than one player, play may be competitive.

Next is the choice of content level. The following screen will appear:

```
         Checkerboard Trails

  Choose a game level:

  Level | Operations  | Type of Problems
    1   |     +       | ⎫
    2   |    + -      | ⎬ positive numbers
    3   |   + - x     | ⎪
    4   |   + - x ÷   | ⎭

    5   |     +       | ⎫
    6   |    + -      | ⎬ negative numbers
    7   |   + - x     | ⎪
    8   |   + - x ÷   | ⎭

  Use arrows to choose, then press Return.
  Press Escape to back up.
```

Here players will decide now difficult the game will be.

Once a level has been selected, one of three difficulty sublevels must be chosen. The sublevels are labeled A, B, and C, with A being the easiest.

Levels of Play

The first four Levels (1-4) of *Checkerboard Trails* deal only with positive numbers. Level 1 covers only addition, while Levels 2-4 each add another operation (- , x , +). There are sublevels within each level.

Levels 5-8 cover the four operations again, this time including negative as well as positive numbers.

How to Play

Now the game begins.

Notice the following information on the game screen:

```
          Checkerboard Trails
   ┌───┬───┬───┬───┐   ╔═══════════════════╗
   │ 0 │   │   │ + │   ║      Target: 5    ║
   ├───┼───┼───┼───┤   ╚═══════════════════╝
   │ + │   │ 2 │ + │   ┌───────────────────┐
   ├───┼───┼───┼───┤   │ Hilary          0 │
   │   │ + │   │   │   └───────────────────┘
   ├───┼───┼───┼───┤
   │   │ 4 │   │ + │   ┌───────────────────┐
   ├───┼───┼───┼───┤   │     Level 1A      │
   │ 3 │   │ 2 │ 2 │   │   Round: 1 of 10  │
   └───┴───┴───┴───┘   └───────────────────┘

   Place these new items:   │ 2 │ │ + │

      Use the arrow keys and Return.
           Press ? for help.
```

■ A checkerboard on which several numbers and operation symbols have already been placed.

■ One square on the checkerboard in which a smaller square is flashing. This is the "cursor," which serves as a place marker.

■ The current target value located in a box near the upper right corner.

■ The names and current scores of all players. One name is highlighted; it is this player's turn.

■ The number of the current round (rounds start at 1 and count up). The total number of rounds, which depends upon the number of players, is also shown.

■ Two boxes near the bottom of the screen, one containing a number and the other containing an operation symbol. These are the current playing pieces.

■ Brief instructions at the bottom of the screen. At most points during the game, you can press the "?" key to get more detailed instructions.

A game lasts from two to ten rounds, depending upon the number of players. Each player gets one turn in each round. There are two steps in a player's turn, placing the playing pieces on the checkerboard and creating a trail.

Placing New Items on the Board

First, players must place the current playing pieces, found in the boxes in the lower right portion of the screen, on the game board. The number found in the square with the white background can only be placed on a white square on the checkerboard. The operations symbol, which sits on a black background, can only be moved to a black square on the checkerboard. Both items can be placed by moving the "cursor" (a flashing square) around the checkerboard using the arrow keys. When the cursor is on the square where the player wishes to place an item, he/she presses RETURN. If the square is white, the number will appear on that square. If the square is black, then the operation symbol will appear on the square. Players are permitted to replace a number or operations symbol already on the board with one of the current playing pieces. Both new items MUST be placed on the checkerboard before players can attempt to build a trail.

It is not necessary to choose which of the two current playing pieces to place on the checkerboard first. The cursor is simply moved to the desired location on the board and RETURN is pressed. The background color of the new items indicates which one will appear in the selected location.

New items need not be placed in vacant squares. If dropped into occupied squares, they will simply replace the existing items.

Creating a Trail

After placing the two current playing pieces, players will try to create a trail that matches the target value. A trail consists of a series of adjacent squares, all of which must contain a number or an operations symbol. A valid trail begins on a number and ends on a number, and contains at least one operations symbol. It may contain up to five operations symbols.

Note ☞

All expressions are evaluated using the standard order of operational precedence. The expression is not evaluated from left to right. Instead, all multiplications and divisions are carried out before additions and subtractions. For example, the expression "2 + 5 x 5" evaluates to "27," not "35."

First players will be asked if they think they can find a trail that matches the target value. If they answer no, they will be given two new playing pieces to place. If they answer yes, they will proceed as described below:

Suppose a player wants to create a trail that looks like "5 + 4." The first step is to move the flashing cursor to the FIRST number in the trail, which in this case is "5." The player then presses RETURN. The flashing cursor changes to an outline cursor. The flashing cursor is then moved around the screen using the four arrow keys or the I, J, K, and M keys.

As the flashing cursor is moved through the squares, two things happen. First, the cursor leaves behind an outline in each square through which it passes. These are the squares that make up the trail. Secondly, the cursor copies the contents of these outlined squares into a large box at the bottom of the screen, showing the expression that is being built.

When building a trail, players press RETURN to signal the BEGINNING of the trail, and then again to signal the END of the trail. RETURN must not be pressed in the middle of the trail.

The outline cursor will not enter an empty square. For example, when building a trail of "5 + 4," the "+" sign must be in a square adjacent to the "5," either to the left or the right, or above or below. Then the "4" must be adjacent to the "+." However, they all do not have to be in a straight line. For example, the "+" may be directly above the "5," and the "4" may be directly to the left of the "+."
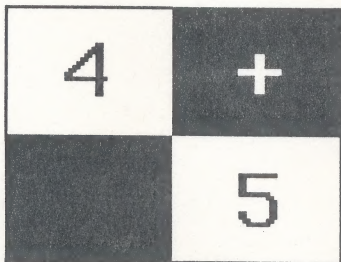
In this case, if the target is "9," a trail that creates the expression "5 + 4" will result in a match, and points will be gained. Players need not use the two items that they just placed on the game board when creating their trails.

There are several things to remember when creating a trail.

A trail can go from left to right or in any of the four directions—up, down, left, or right. The expression is always written left to right in the expression box at the bottom of the screen.

A trail may start in one direction and change directions again and again.

A trail can double back on itself, using the same numbers or operations symbols over and over. For example, the trail "1 + 1 + 1 + 1 + 1 + 1" can be created using only two squares.

A trail CANNOT move diagonally.

At any point before ending his/her turn, a player can signal that the expression is finished but then undo what he/she has entered by pressing ESCAPE.

When players have built the complete expression, they press RETURN one more time. RETURN should not be pressed until the entire expression is built. The expression will then be evaluated by the computer.

If the expression matches the target, a player will receive ten points for each operations symbol in the expression. The squares that make up the trail are then made blank, and a new target value appears for the next player. Any squares that were not used in this first player's trail will still contain their numbers or operations symbols.

If a player was unable to match the target, or if he/she decided not to try, then the next player is given the same target. No items are erased from the game board, and no points are received for that turn. Notice that there is no penalty if a player fails to match the target.

After each turn, the computer randomly places some new items on the checkerboard. If there is only one player, the computer places one new item. If there are two or more players, two new items are placed. The computer then supplies the next player with two current playing pieces that he/she can put anywhere on the checkerboard.

Important Keys

Besides RETURN and the arrow keys, there are several other keys that can also be useful.

DELETE—If players make a mistake in their expressions, the DELETE key can be used to back up. Each press of this key removes one number or operations symbol from the end of the expression. If the entire expression is removed, the solid cursor reappears, and the trail can be started again in a new location.

ESCAPE—This key allows players to change their minds or to back up. At any point in the turn, players can back up, step by step, to the beginning of the turn. Pressing ESCAPE will erase the entire trail and return players to the solid cursor. They can then move the cursor to a new location, where they can press RETURN to start a new trail. Pressing ESCAPE twice will send players back to the beginning of their turn. This allows players to change their minds about the placement of their two current playing pieces.

P—If players are unsure of the value of the expression they have created, and they want to "peek" at its current total, they can press the "P" key. There is no penalty for peeking. Each player is limited to three peeks per game, after which the "P" key becomes inoperative for that player.

When the DELETE or arrow keys are pressed again to continue building or modifying the trail, the current value disappears.

The "Honor Roll"

The "Honor Roll" is a list of teams or players that have received high scores. Along with each name is the score and the game level that was attempted. Scores are saved only when the game is played by a single team or a single player. Names are added to the "Honor Roll" if the new score exceeds the lowest score already on the list. The lowest score is then deleted.

Scoring

Scoring is determined by the length of the expression/trail that a player uses to match a target. Ten points are awarded for each operation symbol in the expression. Because the expression is limited to 5 operation symbols (6 numbers), the maximum value of any one expression/target is 50 points. If the player cannot match the target during a turn, then no points are added or deducted. The number of rounds per game varies according to the number of teams or players.

A perfect score ranges from 500 points in a solitaire game to 100 points in a six-person game. *Checkerboard Trails* can be compared to the game of bowling, in which it is very difficult to achieve a perfect score of 300. Children can expect to receive steadily increasing scores as they master the skills involved. Some players may even achieve that elusive perfect score!
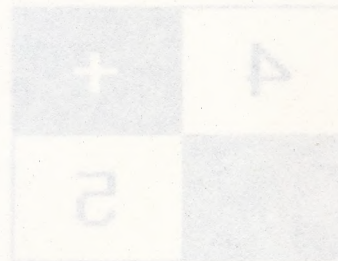
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