COMPUTER BASED LEARNING

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Technology and Basic Skills: Mathematics

(Abridged Version)

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TABS: Estimation
Bull's-Eye

Acknowledgments

Bull's-Eye is a product of the TABS: Estimation group—Lorren Stull, Fred Whiteman, Paul Hinrichs, and Suzanne Damarin. Fred Whiteman was the major programmer; documentation was written by Amanda Damarin.

Bull's-Eye uses the Still Life 1.3 graphics utility, copyright 1984.

Original versions of the *Bull's-Eye* disk were developed by the TABS: Math (Technology and Basic Skills: Mathematics) project under contract with the U.S. Department of Education, Center for Libraries and Education Improvement.

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A Letter to Teachers

The Technology and Basic Skills (TABS) group at The Ohio State University has been developing microcomputer software since 1980. From the beginning, the project staff has worked from the premise that computer-based activities could and should enhance school curricula by providing interesting, interactive learning environments. TABS software has been developed with attention to curricular directions, the results of educational research, the advice of classroom teachers, and the experiences of schoolchildren.

The TABS: Estimation disks were created to provide students with experience in making and refining computational estimates. The developers intended this experience to be both instructive and enjoyable; thus, the disks should invite students to engage in activities that require them to develop and fine-tune their estimation skills. They should also extend, in a meaningful way, the students' learning from textbooks and other sources by making full use of the computer's unique interactive and graphical capabilities. A student who uses the full set of TABS: Estimation disks will have diverse experiences; some of the disks reward speed of estimation, others reward precision, and still others foster the development of strategies.

Bull's-Eye is one of several disks designed to give students practice in making estimates. One of the major features of this program is that students can work on increasing their estimation skills by decreasing the percentage error assigned to each ring of the "dart board." In working with students using this disk, we found that many thought that assigning 100 percent error to the bull's-eye would guarantee positive feedback every time! Their discovery that this was not the case offered a good opportunity to review the meaning of percent in a somewhat different context than usual.

Original versions of this disk were developed by the TABS: Math (Technology and Basic Skills: Mathematics) project under contract with the U.S. Department of Education, Center for Libraries and Education Improvement.

Suzanne K. Damarin

Suzanne K. Damarin, Project Director
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Bull's-Eye

Bull's-Eye is an estimation practice game modeled on the familiar game of darts. Multiplication and division expressions are indicated on the screen, and the job of the player is to estimate the value of each expression. After an estimate is entered, the bull's-eye, or one of the rings surrounding it, is lit to indicate how close the estimate was to the calculated result. The level of difficulty of *Bull's-Eye* can be manipulated in two ways: (1) by choice of the range of whole numbers from which problems are composed, and (2) by adjusting the percent error associated with the bull's-eye and with each of the rings. Thus, players can begin at a level at which they are reasonably comfortable and move to more difficult levels as their estimation skills improve.

Objectives

The overall goal of *Bull's-Eye* is to give players practice in estimating products and quotients, and to encourage them to become increasingly close in their estimates. A secondary objective is to introduce the concept "percent error."

Documentation for *Bull's-Eye*

The main menu appears on the screen following the program titles. Users may choose a number of activities from this menu including an estimation game, options to adjust it, and an exit function.

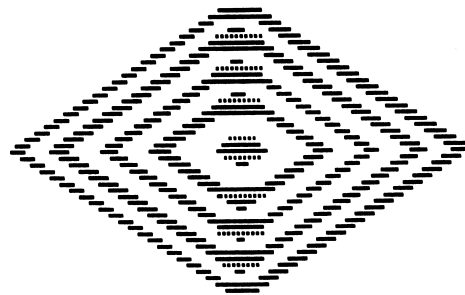**Bull's-Eye**

An Estimation Challenge

<1> Estimate
<2> The Rings
<3> Options
<4> Exit

Use arrow keys to highlight options.
Press **RETURN** to choose an option.

Estimate

This game presents a series of multiplication and/or division problems whose answers must be estimated. After users have estimated the answers, they enter them in the computer and press RETURN. The accuracy of their estimations is judged by how close they come to hitting the bull's-eye.

81 × 35

Enter an estimate,
and press RETURN.

If users' answers are within a certain small percentage of the actual computed answers, they will hit the bull's-eye. If their answers are within certain larger percentages of the real answer, they will hit other rings in the dartboard. (For a more detailed discussion of this, see the "Difficulty" part of the "Options" section.) Users may then press the space bar to continue, or the ESC key to return to the main menu.

The Rings

This section is a brief explanation of the different colored rings of the bull's-eye. It demonstrates how the rings can show how close an estimate is to its actual calculated value. It also shows how the percent error for each problem is found and reminds the user that the smaller the percent error, the better the estimate.

Options

This selection allows users to adjust the games in various ways. It contains its own submenu from which users choose the parts of the game they wish to alter.

Operation

This option allows users to choose whether they will view multiplication, division, or mixed problems.

Numbers

By choosing this option, users may decide whether the problems they view will be of small, medium, or large size. The following chart lists the minimum and maximum numbers of digits in problems of each size, and examples of each.

	Minimum digits	Maximum digits
Small	2 × 2 (47 × 33)	2 × 3 (28 × 456)
Medium	2 × 2 (12 × 72)	4 / 3 (6924 / 238)
Large	3 / 2 (540 / 98)	4 × 6 (4386 × 972365)

Difficulty

This option allows users to decide whether the level of play will be "easy," "so-so," or "hard." Each of these levels shows the percentage within which a problem's computed answer must be estimated in order to achieve the bull's-eye or any of the other rings. The following table describes the settings for each level.

	Easy	So-So	Hard
Bull's-eye *(Blue ring)*	15%	10%	5%
Purple ring	25%	20%	15%
Orange ring	40%	30%	25%
Green ring	50%	40%	30%

There is also an option called "Player Set" that allows users to set the percentages for each ring in the dartboard.

When percentage changes are completed, users may press the ESC key to exit to the Options menu.

Sound

This option allows users to turn the sound on or off.

Summary

The Summary allows users to see a compilation of their efforts after they have completed a number of problems.

```
                    Summary
                 Problems :  10


              Number  Percent
  Bull's-Eye.    5      50%
     Ring 1      2      20%
     Ring 2      2      20%
     Ring 3      1      10%
  other          0       0%



      SPACE BAR to continue or ESC to quit
```

It lists the number of problems attempted, and the number and percentage of problems that fell within the bull's-eye range, as well as within the ranges of the other rings.

Exit

This allows users to exit the game.

Standard Operating Instructions

All TABS programs will run on the Apple // series (Apple II +, Apple //e, and Apple //c).

How to Use the Diskette:

1. Select proper diskette.
2. Hold diskette with thumb over label.
3. Insert diskette carefully into **disk drive** with the label facing up and the oval cutout toward the rear of the disk drive.
4. Close disk drive door.
5. Turn on computer.
   Red light on disk drive indicates that the disk is being read.
6. EBE logo should appear.
7. When program is finished, open disk drive door.
   (Be sure that the red light is **not** on.)
8. Remove diskette from disk drive and replace carefully in protective sleeve (label showing).
9. Turn off the computer.

How to WARM BOOT a disk:

On the Apple II + you must turn the computer off, then turn it back on.

On the Apple //e and Apple //c press these three keys simultaneously:

OPEN APPLE-CTRL-RESET.

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