

DuoWOMBAT-CS

Version 1.5

Candidate's Manual

Electronic Edition

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DuoWOMBAT-CS

Candidate's Manual

This manual should be read attentively by the candidate before commencing the practice period that precedes DuoWOMBAT-CS.

For software version DuoCS 1.4 only.

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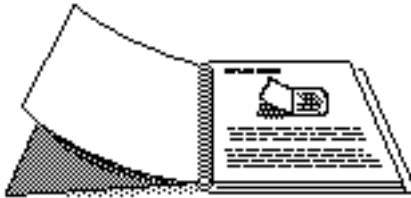
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About this Manual

This manual is your introduction to the complete on-screen instructions and practice phases that will precede the actual DuoWOMBAT-CS exercise. It does not replace those instructions and practice phases, but it will minimize the time you have to spend on them. Its purpose is to familiarize you with the basic vocabulary, the structure of the program, and the control operations you will be handling before you sit down at a DuoWOMBAT display and console and begin the programmed instruction and practice phases.



Introducing DuoWOMBAT-CS

DuoWOMBAT-CS is a computer program that challenges your ability to work as a team member in managing a complex system by presenting situations and evaluating how you and your teammate react to those situations.

In its team performance phases, the program requires you to share various tasks with your teammate, making sure that each of you works on every task frequently. To maximize your team performance score, you need to communicate with each other and work out an effective strategy for deciding on who should work on which task from moment to moment during the exercise. In DuoWOMBAT you work with your teammate; you must cooperate, not compete.

To perform well as a team you must maintain a high degree of awareness of the total situation, including your teammate's performance as well as your own, and between the two of you manage this complex exercise effectively. High scores for team performance depend on how well you and your teammate perform individual and duet tasks but even more on making good decisions as to what tasks each of you should be working on at any given moment during the exercise.

Testing or Training Device

DuoWOMBAT-CS can be either a testing or a training device.

As a test, DuoWOMBAT-CS is used to evaluate a team's combined performance relative to the sum of the individual performance levels of the team members. Depending on the scenario designed by your supervisor, this may require each team member to be tested during solo phases for a few minutes before, between, and after two longer sessions of team performance.

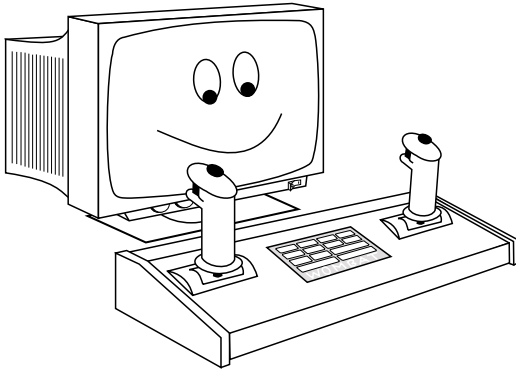
When used as a team training device, often only dual performance is involved following initial instruction. The session is likely to be monitored by a trained facilitator and/or be video taped for debriefing purposes.

Before you start the exercise, you will learn one-by-one, without any scoring, how the different parts of the program work together to simulate the exacting demands of operating any complex system as a team.

Candidate Identification

The first thing DuoWOMBAT will ask you for is your personal identification number, which will be your DuoWOMBAT reference number.

Your supervisor, instructor, or whoever administers the program, will enter your reference number and any other information needed for DuoWOMBAT to keep a record of each team so that its performance scores can be retrieved and printed out at any time for further evaluation and guidance.

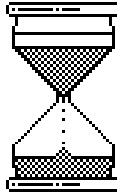


Solo WOMBAT-CS display and console. Each teammate operates one complete set as shown. The two sets are side-by-side on a table and are interconnected by a cable.

Instructions Period

After identifying yourselves to DuoWOMBAT, you will go through some instruction pages that are reviews of what you will read in this manual. This process is done individually, each teammate reading on his/her own computer monitor. You will alternate between instruction pages and practice phases. Each practice phase will cover one aspect of DuoWOMBAT at a time.

Scores are not recorded during the practice phases. Only in the full exercise will all the different tasks be simultaneously available and scored.



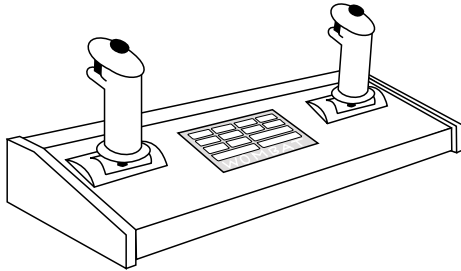
Each page of instructions shows how much time you have left before the exercise begins. As long as there is some time remaining, you can go back to any instruction page or practice phase you wish to review.

Once the instructions period is over and depending on the scenario designed by your supervisor, you may be committed to the complete exercise. You may not be able to go back to the instructions during the full exercise, so you should use the time allowed in the instruction and practice phases wisely.

If you need to use the washroom, make sure you come back before the instructions period is over; otherwise the exercise will begin without you.

WOMBAT Console

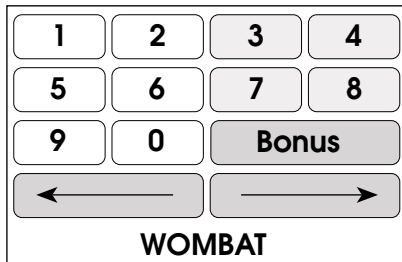
Each teammate will operate his/her own WOMBAT console.



The WOMBAT console

Each WOMBAT console has a special keypad. This keypad is very sensitive. To indicate it has received a signal from the candidate, the computer will produce a sound ("click") each time a button is pressed on the console, and again when the button is released.

On the WOMBAT's display, each functional button will be indicated by its legend within a colored rectangular box.

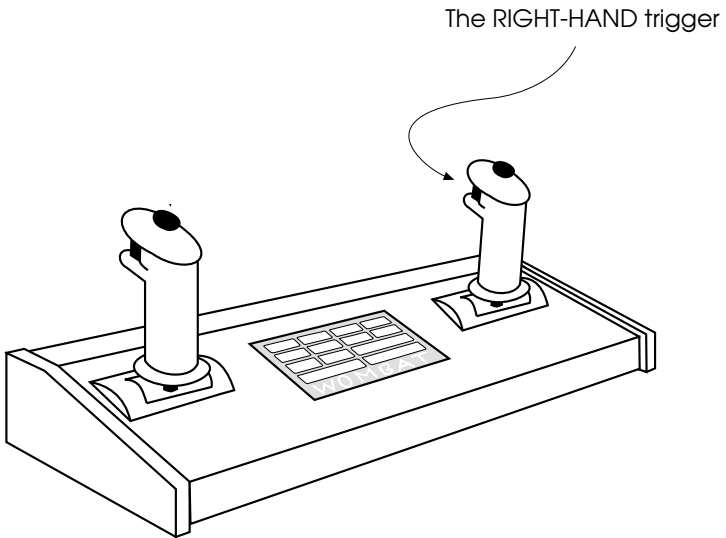


The WOMBAT keypad

WOMBAT Console: Right-Hand Trigger

On the WOMBAT console, each joystick includes a spring-loaded red trigger switch. Only the **RIGHT-HAND trigger** switch is used in DuoWOMBAT. You will learn the function of the Trigger and when to use it later.

In the practice phases, you will be given opportunities to use each of the control devices by itself to control part of the DuoWOMBAT exercise.



The Tracking Task

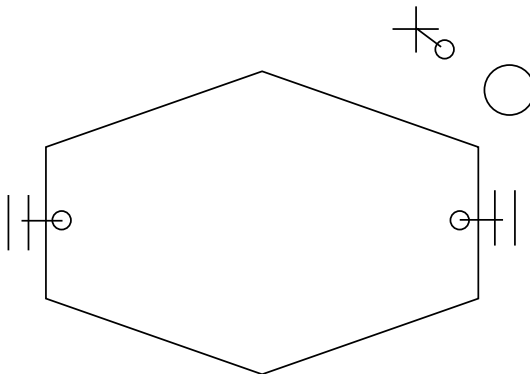
The first task you will learn about is the Tracking Task. Later you will learn about the three Bonus Tasks.

The Tracking Task is the primary task for the entire DuoWOMBAT exercise in the sense that it must be monitored at all times and attended to frequently. In this task, you and your teammate will use control sticks to make yellow cursors follow the moving blue targets in two different control modes.

The “cursor” for the left-hand task consists of two pairs of short vertical lines with small attached circles showing the direction and amount of stick command. The left-hand sticks on both consoles control the lateral separation of the line pairs, closer and farther.

The “cursor” for the right-hand task is a cross-shaped symbol with its attached circle indicating stick-command. The right-hand sticks of both consoles control its vertical and horizontal movement.

The figure below represents the complete Tracking Task. The following pages will describe each function you have to perform.



The illustration above represents the complete Tracking Task as it appears on the DuoWOMBAT display. The “target” for the left-hand Tracking Task is the two vertical sides of a hexagon that slowly expands and contracts. The task is to track the vertical sides of the hexagon with the left-hand “cursor” (the two pairs of short vertical bars). The “target” for the right-hand Tracking Task is a circle that moves slowly in any direction over the display. The task is to track the circle with the right-hand cursor (the cross with its associated stick-command indicating circle). You will perform the Tracking Task with both hands after having learned each hand’s function separately.

Using the Left-Hand Stick

The left stick controls the left/right separation of two pairs of short vertical lines (as shown below) in two different modes: velocity control and acceleration control.



There is a small circle that is shifted away from the center of each pair of vertical lines by a distance that is proportional to and in the direction of the stick displacement (shown above for left stick pushed forward.) Each small circle is connected by a line to the center of the pair of vertical lines.

Velocity control

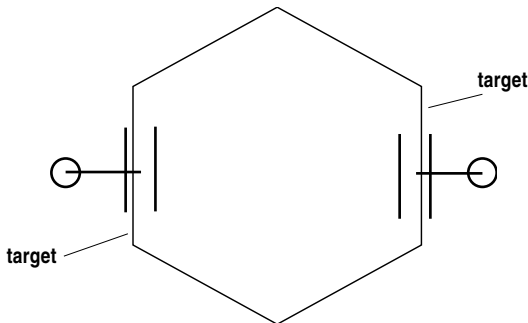
In **velocity control**, the vertical lines are stationary until the stick is moved. Pushing the stick forward from spring center makes the two pairs of lines move away from the display center, and the farther the stick is pushed, the faster the movement is. Pulling the stick backward from spring center reverses the direction of motion, causing the pairs of lines to move inward.

Acceleration control

In **acceleration control**, the stick determines the rate at which the velocity changes. At spring center, the velocity remains fixed, so the pairs of lines move toward or away from the display center at a steady rate. Displacing the stick fore and aft from spring center accelerates or decelerates the cursor's movement, depending on the direction of existing movement.

Pushing the stick forward from spring center causes the velocity away from display center to increase (or velocity toward the display center to decrease), while pulling the stick the other way causes the velocity away from the display center to decrease (or velocity toward the display center to increase). The farther the stick is displaced from spring center, the faster the velocity changes.

Whether in **velocity control** or **acceleration control**, the task is to keep the two pairs of vertical bars over the two vertical sides of a hexagon that expands and contracts in size around the center of the display. By keeping the bar pairs (the cursors) over the left and right sides of the hexagon (the targets), you will maximize your left-hand tracking score.



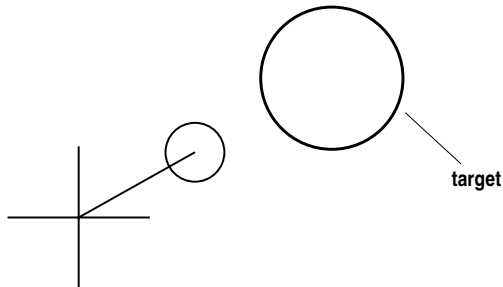
The illustration above represents the blue expanding/contracting hexagon in the center and the two yellow bar pairs you will control with the console's left stick. The two small predictor circles show the left stick being pushed forward. This action will make the bar pairs move away from the center of the display (in the direction of the predictor circles) if in the velocity-control mode and to accelerate in that direction if in the acceleration-control mode.

Using the Right-Hand Stick

The right-hand stick controls the position of a small cross on the screen using the same modes (velocity or acceleration) as the left-hand stick. Both sticks will always be in the same control mode at any given time. Left and right movement of the right stick controls left and right position of the cross, and forward and backward movement controls the up and down position.

There is a small circle that is shifted away from the center of the cross by an amount proportional to and in the direction of the stick displacement (shown below for right stick pushed forward and to the right). A line connects the center of the circle to the center of the cross.

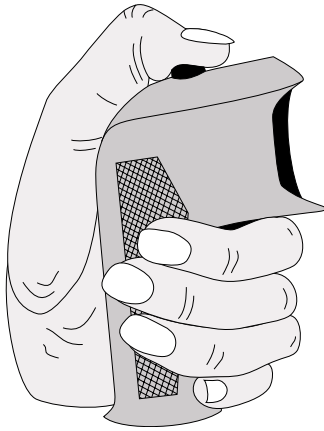
Your right-hand tracking task is to maintain the position of the cross within the boundaries of the same size target circle. This will produce the maximum right-stick Tracking-Performance score.



The illustration above represents the yellow cross you will control with the console's right-hand stick. The small predictor circle (connected by a line to the center of the cross) indicates that the right stick is pushed forward and to the right. This action will help move the cross toward the moving blue target circle, reducing the tracking error. The goal is to keep the center of the cross within the boundaries of the moving target circle.

Viewing the Tracking Task

During Duo phases, the left-hand Tracking Task appears only on the display of the teammate who presses and holds the left-hand stick's thumb switch. Similarly, the right-hand Tracking Task is only presented on the display of the teammate who presses and holds the right-hand stick's thumb switch.



Pressing and Holding the Thumb Switch

However, only one teammate at a time can call up each of the Tracking Tasks. Whenever both teammates attempt to view one of the Tracking Tasks by simultaneously pressing their corresponding thumb switches, that task is not shown on either display and will remain invisible until one of the two teammates releases a thumb switch.

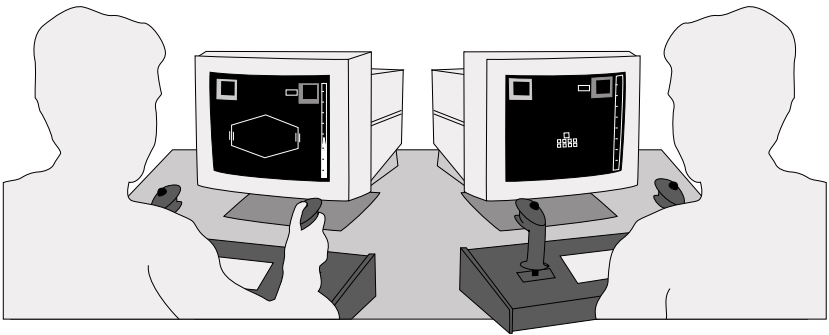
The situation just described is called a **viewing conflict**, and until the conflict is resolved, the Tracking Performance for that task will be zero. Working out effective procedures for sharing the Tracking Tasks with your teammate will help avoid costly periods of viewing conflict.

Controlling the Tracking Task

During Duo phases, although only one teammate can **view** one or both of the tracking tasks at any given time, both teammates can **control** the cursors all the time. The four joysticks are active whether or not a Tracking Task is visible on a given teammate's display.

Consequently, one teammate can help or interfere with the other who is viewing and presumably controlling one or both of the tasks. While this can be helpful, it can end up in an overcontrol situation or, worse, in teammates fighting over the control of the same cursors.

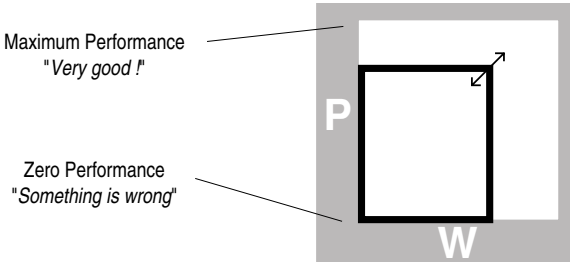
Teammates must agree on how to share the Tracking Task to avoid interfering with each other. They should use good team resource management to achieve the optimum combined team score.



Throughout the DuoWOMBAT exercise, you and your teammate will sit side-by-side in front of the two WOMBAT displays and consoles. Task sharing is a big part of a successful DuoWOMBAT performance. To avoid fighting over the tracking controls, establish efficient communication procedures and keep assessing your progress. Use all your team's available resources to maximize the team score.

Combined Tracking-Task Performance

The combined action of the left-hand and the right-hand Tracking Tasks is displayed on Tracking Worth-Performance Indicators that are always visible in the upper-left corners of both displays. The indicators are scaled from "Zero Performance" at the bottom to "Maximum Performance" at the top.



The Tracking Worth-Performance Indicator shown above is always visible in the upper left corner of each DuoWOMBAT display (the double-headed arrow is only shown here to indicate variability). The indicator shows a less-than-maximum Tracking Performance (P) at less-than-maximum Tracking Worth (W). The Tracking Performance depends on the distance (or "error") that separates the two bar-pairs from the vertical sides of the hexagon and the center of the cross from the edge of the circle.

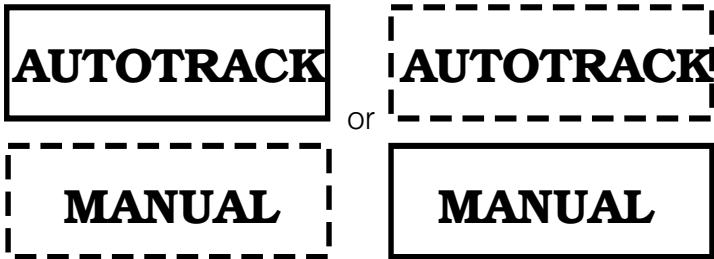
Your primary task will be to track the left-hand and right-hand targets to achieve the highest combined team tracking score that you can.

When the tracking is within the permitted error limits, the Tracking Performance will be the maximum possible. When the tracking is less than optimum, the Tracking Performance will decrease in proportion to the distance between the yellow cursors you are controlling and the error limits of the blue targets.

Remember that the higher your Performance is, the more points you will accumulate. Good tracking techniques and an effective strategy for sharing tasks are therefore essential for maximum Tracking Performance.

WOMBAT's Autotrack Mode

An automatic tracking mode called "Autotrack" is available for you to delegate the Tracking Task to the computer. It will be engaged or disengaged with the trigger on the right-hand control. The active mode will be indicated by solid lines around one of the display legends, MANUAL or AUTOTRACK, and dashed lines around the other.



To engage the Autotrack mode, you alone, your teammate, or both of you must first track the targets with the left and right control sticks within the indicated error limits to produce the maximum Tracking Performance score and then pull the trigger. When either the vertical lines (left-stick targets) are not between the pairs of bars (left-stick cursors) or the cross (right-stick cursor) is not within the circle (right-stick target), pulling the trigger in the manual mode will have no effect.

In the Autotrack mode, the sticks become inactive and the stick-position indicators return to the spring-center locations. Pulling the trigger on the right stick will immediately disengage the Autotrack mode and return the sticks to the active state.

WOMBAT's Autotrack Mode (continued)

To make the operation of the DuoWOMBAT Complex System more challenging, the Autotrack mode has been designed to fail frequently, and these failures can be detected at any time by keeping an eye on the Tracking Performance indicator. When Autotrack mode fails, it does not disengage, it continues in Autotrack mode with its ability to track the target motions decreased.

To restore the Autotrack mode function, you must first disengage the failed Autotrack mode with the right-stick trigger and track manually. For several seconds following Autotrack disengagement, the Autotrack mode is under repair and unavailable. This state is indicated by the Autotrack symbol filled in RED on the display, as shown below.

Even if you manually track to achieve a perfect Tracking-Performance score and pull the trigger while this symbol is displayed, the Autotrack mode will not engage.



The "AUTOTRACK" box is filled with RED

You will have practice sessions in velocity-control and acceleration-control that will begin with the Autotrack mode active and engaged. It will soon fail so you can practice disengaging the Autotrack mode, tracking manually, and then re-engaging it when it becomes available again.

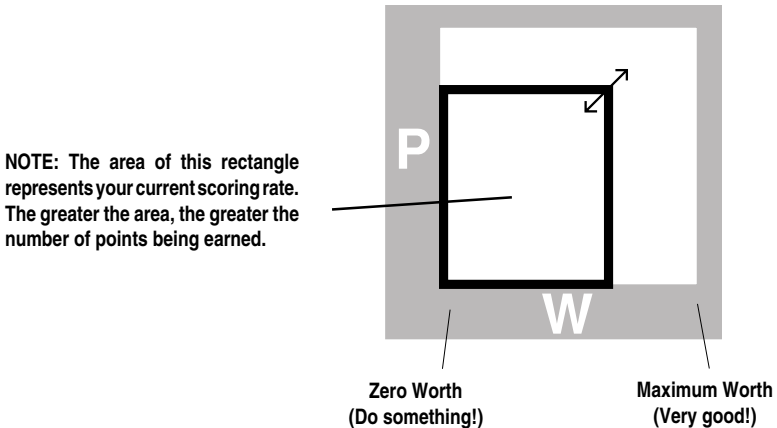
Tracking Worth

As was shown in the diagram on Page 17, the Tracking Task has a Worth, which changes many times during the exercise. In addition to the left-hand and right-hand Tracking Tasks, there are three Bonus Tasks to be described later that can be selected and worked on by either or both teammates.

The secret of maximizing the team's DuoWOMBAT score is making choices of what each teammate works on from moment to moment that lead to high Worths for each of the tasks so that many points are scored when a task is performed well.

The Tracking Worth is influenced by your team's performance in detecting and managing Autotrack failures quickly and efficiently, by sharing adequately the tracking responsibilities, and by when you and/or your teammate last executed a Bonus Task.

During an Autotrack failure, if you allow Tracking Performance to drop below a certain level, a penalty will be applied in the form of a reduction in the Tracking Worth. However, if you keep the Tracking Performance above another, higher level, the Tracking Worth may actually be increased. If you never play Bonus Tasks, but track targets all the time, the Tracking Worth will decline slowly until it reaches zero. Each time you complete a Bonus Task, the Tracking Worth will be reset to its full value for the current situation.

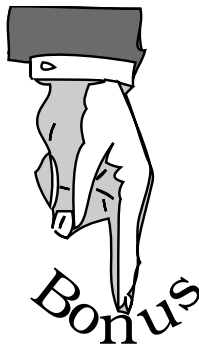


A Tracking Worth-Performance Indicator is always visible in the upper-left corner of each DuoWOMBAT display. The letter "W" indicates the Tracking Worth for the current penalty situation. You can influence the Tracking Worth by frequently playing Bonus Tasks, by managing Autotrack failures effectively, and by sharing the left and right tracking responsibilities at the time of Autotrack engagement. Keep an eye on this indicator.

The Bonus Pouch

The designers of DuoWOMBAT expect that your team, as well as most other teams, would achieve such high tracking performance levels (with the help of Autotrack working properly most of the time) that all teams would earn about the same score based on the Tracking Task alone.

So, to distinguish those with higher and lower situational awareness and teamwork, three additional tasks, called **Figure Rotation**, **Quadrant Location**, and **Digit Canceling**, are available for you to earn "**Bonus points**" in 60-second trials.



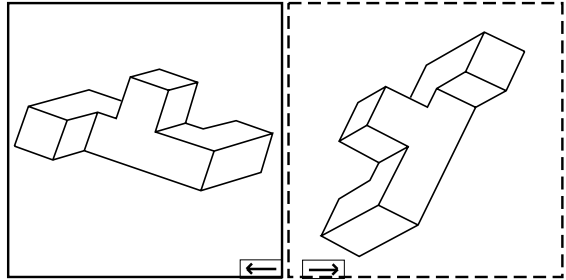
When the Tracking Task is being controlled by Autotrack or by your teammate and you wish to earn some bonus points, press the **Bonus** button on the keypad. This will switch you to the Bonus Pouch and remove the Tracking Task from the display. Only the Tracking Worth-Performance Indicator will remain so that you can continue to monitor that task. Pressing the **Bonus** button again at any time will suspend the Bonus Task for later resumption and return DuoWOMBAT to the Tracking Task.

You will be given practice periods that start with the Tracking Task where you can press the Bonus button to switch to the Bonus Pouch to practice each of the three Bonus Tasks.

The Bonus Pouch, Figure-Rotation Task

In its solo version, this bonus task will show two 3-D figures side-by-side on the same display (the duet version is explained on Page 25). One figure will be inside a solid square and the other figure will be inside a dashed square. The solid square means that you can rotate the figure using the two sticks; it is the **active figure**. The dashed square means this figure is **standing by** and can be **made active by pressing the corresponding arrow on the console**.

Using both sticks, you can rotate the active figure until you know all the details of its construction. Press the appropriate arrow to make the other figure active, so you can rotate it also. **Both sticks are used to rotate one figure.**



This task will display two 3-D figures. You can rotate each figure, one at a time, using the joysticks.

The goal of this exercise is to find out, as fast as you can, whether the two figures are:

- identical,
- mirror symmetric (mirror images of each other), or
- different in some obvious way.

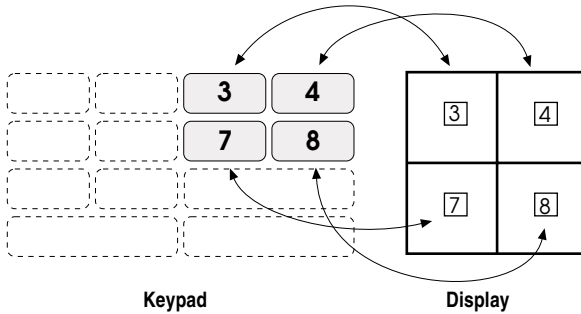
You earn points by giving the computer the correct answer. As soon as you answer, the Performance and Worth are fixed and scoring takes place until the end of the 60 seconds. If you haven't answered, the Worth starts decreasing 15 seconds after the start of the problem, so don't waste any time!

If your answer is correct, you may press the 4 button on the console keypad and continue with a new 3-D problem while you still have some time left. Try to solve as many 3-D problems as you can during the 60 seconds to earn more points. If your answer is incorrect, you can use the rest of the 60 seconds to find out why your answer was wrong.

The Bonus Pouch, Quadrant-Location Task

In its solo version, this bonus task displays four quadrants (the duet version is explained on Page 25). As shown in the illustration below, each quadrant is identified by a number corresponding to a button on the keypad. The **3** button corresponds to the upper-left quadrant, the **4** button to the upper-right quadrant, the **7** button to the lower-left quadrant, and the **8** button to the lower-right quadrant.

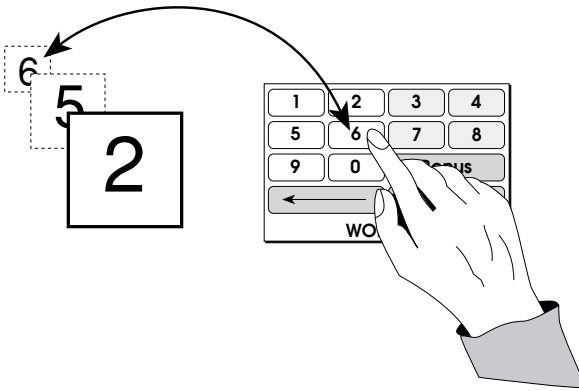
Consecutive numbers from 1 to 32 are placed 8 each and visible in the four quadrants on the display. The task is to find each number in **ascending order** beginning with 1 and press the button on the keypad that corresponds to the quadrant in which it lies, thereby canceling the numbers in sequence, 1 through 32.



Your score increases for each correct quadrant button pressed and decreases for each incorrect button. You must press the correct quadrant button for each number before going on to the next.

If all 32 numbers are found and correctly located within the 60 seconds allotted, then the rate of scoring continues for the remaining time. If you make few errors, you will be offered the chance to press the **4** button on the keypad to cancel another sequence and earn even more points during the time remaining.

The Bonus Pouch, Digit-Canceling Task



In this solo bonus task, single digits (1 to 8) will be displayed briefly at set time intervals in the square at the center of the display (the duet version is explained on next page). Starting with the third digit displayed, as soon as each new digit appears, you should press the button on the keypad matching the digit displayed two back in the sequence.

For example, in the figure above, the digit "2" has just been shown on the DuoWOMBAT display, so the candidate is about to cancel the "two-back" digit "6". Once this action has been completed, another digit will be shown on the display, and then the candidate should cancel digit "5" which is next in sequence. **You must press a digit button, correct or incorrect, or you will not see the next digit in the sequence.**

The interval between the digits is not constant throughout the 60 seconds. Each time you repond in the Digit-Canceling task the interval is adjusted. If you are fast and correct the interval will decrease (digits will be shown faster) in successive steps to a minimum and the Bonus Worth will be increased (more points to earn). If you are slow or incorrect the interval will be increased (digits will be shown slower) in steps until it reaches a maximum and the Bonus Worth will be decreased (fewer points to earn).

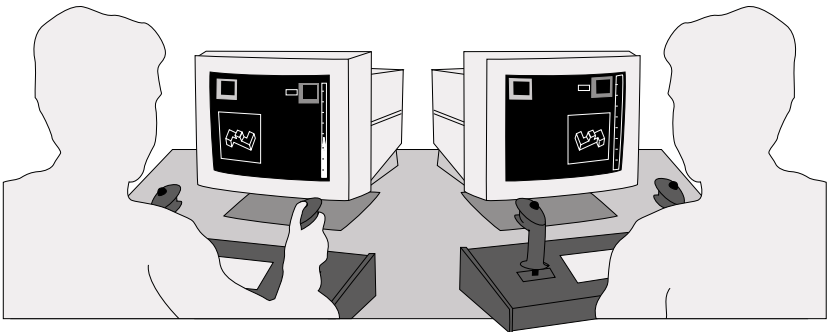
You will win points for each correct response and lose points for each incorrect response or delay in making a response. Fast and accurate reponses earn more points.

In the previous pages, you learned about the Solo Bonus Tasks. However, Duet versions of each must also be performed frequently with your teammate. Duet Bonus Tasks are similar to their solo versions but require the participation of both teammates for maximum performance scores.

The **Duet Figure-Rotation Task** shows one 3-D figure on each display. The teammate sitting on the left-hand side will control the figure that would appear on the left side of a solo WOMBAT display. Similarly, the teammate on the right will control the figure that would appear on the right side of a solo WOMBAT display (as illustrated below). Each teammate can manipulate his/her respective figure. Either teammate can answer the problem; however, only the first response will be accepted by the program and will be scored on the side where it was made. Observe the current Worths for each teammate to decide which will earn more points for the team with a correct answer.

The **Duet Quadrant-Location Task** displays identical numbers in the four quadrants to each teammate. Either teammate can cancel numbers and earn points, but close observation of the Worth and Performance indicators will help establish an optimum strategy for determining who should cancel which numbers.

The **Duet Digit-Canceling Task** will display the same sequence of digits to each teammate, and either can respond. Again, close observation of the Worth and Performance indicators will help establish an optimum strategy for determining who should cancel which numbers.



The two teammates above have agreed on doing a Duet Figure-Rotation Task. The left teammate controls the left-hand 3-D figure while the right teammate controls the right-hand 3-D figure. Either teammate can respond, but the program will accept only one answer. The sooner a correct answer is given, the sooner additional problems can be called up and solved. To maximize the combined team score, teammates must keep an eye on the changing Worths and determine who can earn more points by making correct responses.

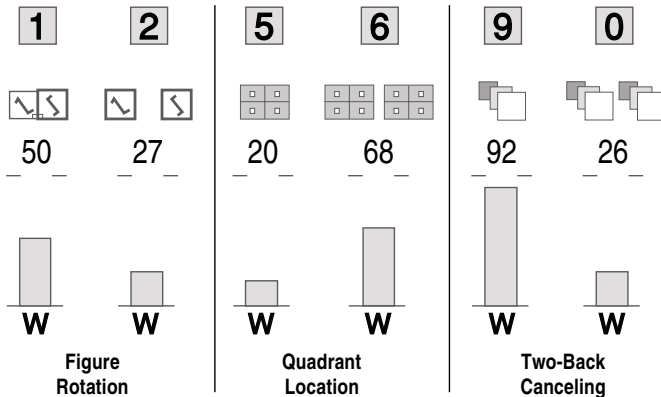
Bonus: The Bonus-Pouch Menu

When in the Tracking Task with no suspended Bonus Tasks, pressing the Bonus button on the keypad will display the Bonus-Pouch Menu. The same menu will also appear each time a Bonus Task ends. On the menu, the variable Worth of each Bonus Task is indicated by a small vertical bar marked **W**. The longer the vertical bar is, the greater the Worth of that Bonus Task. The greater the Worth, the more points that can be earned with the same performance.

Each teammate can choose any Solo Bonus Task regardless of its Worth by pressing key **1**, **5**, or **9** on the WOMBAT keypad. When a Bonus Task is chosen, its Worth will be decreased the next time the menu appears, while the Worths of the five other Bonus Tasks will be increased. The Worths of all Bonus Tasks will be reduced when the Autotrack mode fails, and they will be increased when Autotrack is repaired and once more engaged.

Similarly, any Duet Task can be chosen by pressing **2**, **6**, or **0**, and this will affect the subsequent Task Worths as described above. However, choosing a Duet Task will freeze your Bonus activity until your teammate has completed other Bonus activity and is free to join you in the same Duet Task. Good coordination is therefore essential so you don't lock yourself in a wasteful waiting period.

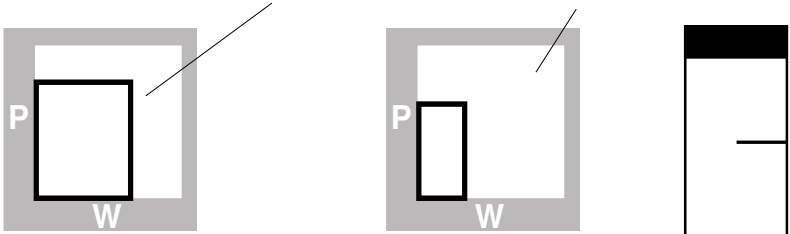
Bonus Pouch Options



In this Bonus-Pouch Menu, the Duet Figure-Rotation Task is worth less than its solo version and about the same as the Duet Digit-Canceling Task. If a teammate selects the Solo Digit-Canceling Task by pressing the 9 key, its Worth will be decreased slightly the next time the Bonus-Pouch Menu appears, and the five other Worths will be increased.

Worth and Performance: A Winning Combination

Worth-Performance Indicators for the Tracking and Bonus Tasks appear, respectively, in the upper left-hand and upper right-hand corners

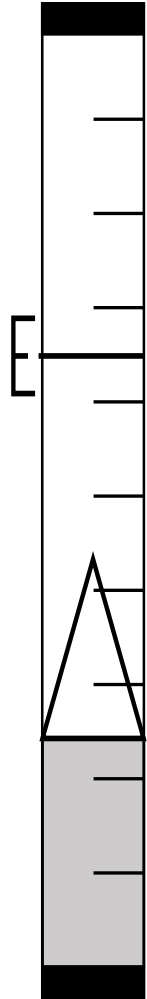


of each DuoWOMBAT display. In addition a vertical scale at the right edge of each display shows (1) your team's current overall score, (2) its current scoring rate, and (3) its "predicted" final score.

The current overall score, combined for the two teammates, is shown by the height of a solid bar that rises gradually from the base of the scale during the exercise. The current overall scoring rate is shown by the height or "sharpness" of a triangle with its base atop the solid bar, and the predicted final score is shown by a line with an E (for End) at its left side.

Your overall current scoring rate depends on the areas of the interior rectangles of the Worth-Performance Indicators. The areas are added, and the sum determines how fast your team's current overall score is increasing as well as the height of your recent scoring rate indicator: a tall triangle means you are doing well, and a short triangle means that something is wrong and you should be working on a different task or doing your current task differently.

The "predicted" final score is the current overall score plus the current scoring rate extrapolated over the time remaining.



Maximize your final score by skillful individual performance of high-worth tasks and efficient task-sharing with your teammate.

Ready for the Instructions?

When you have read and reread this manual you will be ready to sit down at a DuoWOMBAT-CS display and console and begin the instructions period. You will understand how the different parts of the WOMBAT console control the DuoWOMBAT-CS exercise, and you will know the key terms that will be used in the instruction pages. Most of those pages you will recognize as restatements of what you already know, but their associated practice phases will provide you an opportunity to master all the individual tasks that can only be described in words or shown in static pictures in this manual.

Remember, your team's overall goal is to come to the end of the exercise with as many points as possible. To achieve this goal you will have to remain alert to what is going on, particularly to changing conditions, exercise good judgment in your choices of actions, maintain social grace in working with your teammate, and

ENJOY THE EXERCISE !