

Program Submittal

00205 D

New Program

Revision to
Program No. []

HP-67 Serial No. 1 6 0 9 A 0 0 5 5 6

HP-97 Serial No. []

Program Title

Underline 1 or 2
Keywords

6 7 - S T A R T R E K - A D V A N C E D

Keyword(s)

Underlined
in Title

1 S T A R
2 T R E K

No. of Steps 1 1 1 3

Category No. 9 9 9 8

Category Name G A M E S

Abstract- 75 Word Maximum Here are 1113 steps of decision; making that put the pressure on you, the captain. You fly the U. S. S. Enterprise on a triaxial coordinate system tracking down Klingon, Romulan, and Vallician war vessels in addition to a stranded Nubian freighter. Functions include advanced sensor system, course controls, shields, phasers, photon torpedoes, transporter, tractor beam, Romulan cloaking device, self-destruct, and even a practice "firing range."

Name LARRY

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SCHNEIDER

First

Initial

Last

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Acceptance Choice: Four Programs or Two Programs and 10 blank cards. Please credit the free programs to me. Can I possibly receive more than 10 cards due to the length of the program? Thank you... []

Submittal Checklist: Please use the checklist below to insure submittal of all the proper program documentation.

Program Submittal
 Program Description I
 Program Description II

User Instructions
 Program Form(s)
 Magnetic Card(s)

ACKNOWLEDGMENT AND AGREEMENT
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Signature [Signature]

Date 9/27/76

Program Description I

Program Title STAR TREK-ADVANCED

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Program Description, Equations, Variables COMPLETE INSTRUCTIONS

THE PROGRAMS: Program #1: Initialization and Long Range Tracking System; This program starts the game off by generating random coordinates for the four alien vessels, and presetting the Enterprise coordinates, the fuel, the damage control, the sensor memory. In addition, this program controls the long range tracking system, a type of sensor probe used for vessels in deep space. Program #2: Course control and Sensor Probe; This program allows the captain to set the course of the ENTERPRISE and to operate the sensor system. Program #3: Battle Alert. This program does the necessary presetting prior to a battle with an alien vessel. Program #4: Shields and weapon fire; This program allows the user to set the ENTERPRISE shields, to fire its phaser banks, and to fire its photon torpedoes. In addition, it controls weapon fire upon the ENTERPRISE by an alien ship. Program #5: Post-firing operations; This program does the necessary presetting after a battle with an alien vessel. It includes ENTERPRISE self-destruct, a corbomite maneuver, and sensor repair operations. Program #6: Transport/Tractor beam/Docking; This program controls salvaging operations of the Nubian freighter and ENTERPRISE docking at Starbase. HOW TO PLAY.....

Operating Instructions and Warnings Welcome aboard the United Starship Enterprise. You are now the captain of this vessel and must make the decisions regarding the safety of the ship and of the crew. You fly the Enterprise on a triaxial coordinate system, each point corresponding to three coordinates, x, y, and z. This "galaxy" is represented in Fig. 1. You must never take the ship outside this area. Each axis is 100 units long in the positive direction so that you are playing in a cube with the following points as

its corners: 0,0,0; 0,99,0; 99,99,0; 99,0,0; 0,0,99; 0,99,99; 99,99,99

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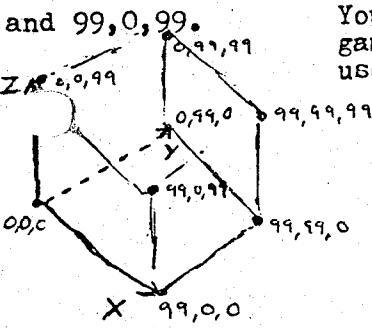


FIGURE 1

Your primary objective when playing Star Trek is to finish the game; that is, don't get blown up! No matter how much fuel you use, the ship, the crew, and you are no good to starfleet command blown "sky" high! Of secondary importance is your fuel. For the purposes of this game, fuel starts at 0 and increases. Hence, at the game's end, you will know how much fuel you have used up. Your goal each time you play Star Trek is to use the least amount of fuel possible. In this way, you can compare your play from one game to the next.

Aside from the Enterprise, there are four other vessels that play in this game (all represented by the calculator). Three of these are enemy vessels and they are (BEGINNING WITH THE STRONGEST): Klingon warship, Romulan warship,

Vallician warship. The fourth vessel is a friendly, stranded, Nubian freighter which you must salvage at one point or another during the game. The warships on the other hand must be destroyed! The (x,y,z) coordinates of the Enterprise are always displayed in the following way: XX.OYYOZZ where XX, YY, and ZZ are the x,y, and z coordinates (from 00 to 99) and the O's are placeholders. The coordinates of the other ships are stored in their respective registers in a slightly different format: 1XX.1YY1ZZI where XX, YY, and ZZ are the x,y, and z coordinates, the 1's are placeholders, and I is the identification number of the vessel (Klingon=2, Romulan=3, Vallician=4, and Nubian=1). However, anytime these coordinates are displayed, they are done so in the same format shown for the Enterprise. In addition, the ID numbers for each alien vessel correspond to the secondary storage registers where their coordinates are stored.

PLAYING THE GAME.....

The 6 program cards for Star Trek are for the most part ordered in the sequence in which you will use them. After running card 1 through the reader (both sides), it should be placed in the slot above the user-definable keys and left there for the game's entirety. The labels for this card are as follows: A--(Course) change; a--(Course) steady; B--Sensor probe; C--Phasers; D--Photon Trpd's; ~~E~~; E--TTB/Prac.; e--Init. To begin the game, one must first input a random "seed" between 0 and 1 such as .1234567898 or .493768209. Try a practice game now. Input the seed .5514650293 (after reading card 1 of course). Now hit

The program is now presetting the secondary storage registers. In addition, it is also running through the Long Range Tracking System. LRTS is used as an aid in tracking down any one of the four ships randomly situated on the axes. Operating the LRTS uses up 250 units of fuel EXCEPT for the first time it is run which is now directly following initialization. You may use this system anytime during the game (it is operated directly by reading card 1 ~~.....~~). Note that the result 134 is blinking. ALL KEYSTROKES DURING STAR TREK ARE DONE DURING THE BLINKING PROCESS. In other words, a program should never stop running until the game is completely over. Even the magnetic cards are read during the blinks. Should you accidentally hit a key outside of the blink "window", the program will stop. Usually you can set things straight again by simply hitting R/S. This goes also if an entry you make should cause the display to say ERROR. Let's return now to our program which is now blinking 134 (Complete initialization takes from 45 to 60 seconds). 134 is called the mission sector and supplies us with information regarding the position of one alien vessel. Each digit of the mission sector corresponds to the range of the coordinate values, x, y, or z. For example, if the first digit of the mission sector was 1 (which it is), we would know that the x value of one of the alien ships is between 0 and 24 inclusive. 2 would correspond to a value between 25 and 49, 3, between 50 and 74, and 4, between 75 and 99. Thus in this example, one of the alien vessels has an x value from 0 to 24, a y value from 50 to 74 and a z value from 75 to 99. As a result of this information, we can now set a course for the Enterprise which is not totally derived from conjecture. We can set a course which would send us in the general direction of the mission sector. With luck, we'll come within range of another ship on the way, fight IT, and then still know in which direction to head for another alien contact. One word of advice regarding LRTS. Try not to overdo running this program unless you have absolutely no idea where to start looking for the enemy. 250 units of fuel can certainly go toward a better cause!

ENTERPRISE COURSE CONTROL.....

Now during one of the blinks of 134, read in both sides of card 2. Note that the program never stops running but goes directly onto the program on the new card. blinking in the display is the number 0.000000. This represents the Enterprise

Program Description I

Program Title STAR TREK-ADVANCED

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Program Description: Equations, Variables, coordinates which are now 0,0,0 (Starbase 0). Moving the Enterprise requires three inputs, the distance and two angles represented by ϕ and θ . Once input here, a value will be retained in the display. For example, hit the following keys all during one blink: 3 ENTER 2 ENTER 1 ; 1.000000 is now in the x register (and display), 2 is in the y register, and 3 in the z register. The same can be accomplished if you hit 3, let it blink, hit 2, let it blink, and then hit 1. Note however if you hit 3, let it blink, 2 ENTER, let it blink, and 1 the registers (from T to X) will be 3,2,2, and 1. The point of all of this is to show you that inputting values for course change need not be hurried but they must be input correctly or else your values will not be positioned correctly in the stack (R(distance) in the z register, ϕ in the y register, and θ in the x register and display.). A course change may be implemented at any time EXCEPT when you are under attack (ENEMY vessel is fewer than 35 units away from the Enterprise). Fuel drain for movement is calculated from 5 times the value of R (the distance moved) or 6 times R when the tractor beam is on (more about that later). The first input necessary as mentioned is the variable R. There is no limit to this input. An advantage of taking shorter jumps from one point to another is that in conjunction with the sensor system, one might be able to more accurately determine the angular inputs that are best in directing the ship toward an enemy vessel. The second input is the azimuthal or horizontal angle, ϕ . This angle represents your direction on the horizontal plane; thus, it would correspond to the angle you would use on a two dimensional X,Y coordinate system (0 degrees to the right, 90 degrees forward, 180 degrees to the left, etc..).

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This angle must be within the range 0 to +180 and -1 to -179. The third input is the angle of elevation, θ , or the vertical angle and must be in the range -90 to +90. -90 corresponds to going directly downward while +90 is upward). Note that if this is either ± 90 , it makes no difference what the horizontal angle is. Should θ ever equal ± 90 degrees, use the convention of setting θ equal to 0 (this is important when firing weapons). Let's try a few operations for practice. To move five units to the right, we would hit 5 ENTER 0 ENTER 0 A (course change). The Enterprise coordinates are now 5,0,0. To move another 5 units to the right, one need only press f A (course steady). Do that now and see the new coordinates 10,0,0. Move 5 units straight up: 5 ENTER 0 ENTER 90 A...coordinates are now 10,0,5. Now 5 units forward: 5 ENTER 90 ENTER 0 A...The coordinates are now 10,5,5. By hitting 12 ENTER 153 CHS ENTER 24 CHS A, the Enterprise will return to Starbase 0 (0,0,0). The Enterprise coordinates will not change under the following conditions: 1) The Enterprise is under attack (an enemy vessel is less than 35 units away); if this is the case, Code 1 will be displayed. or 2) The new Enterprise coordinates would not lie in the range specified on the first page of instructions; if this is the case, the user WILL be charged for the fuel that would normally have been needed! The Sensor Probe program on card 2 is used to determine distances to alien vessels. Once the distance separating the Enterprise and an alien vessel is less than 40, the identification of the vessel will be revealed (unless sensors have been damaged--more about that later). At a distance ~~of~~ under 35 units, the Enterprise is considered to be under attack and cannot move. Starfleet orders clearly state that the Enterprise must stay and fight the enemy ship until the last possible moment. With the display blinking 0.000000, hit B to operate Sensor Probe. The number that comes up is -81.351091. This represents the distance in units to the ship closest to the Enterprise but more than 40 units away. It is the last output from sensor probe and is recognized by the negative sign. The display then returns to the Enterprise coordinates 0,0,0. Given the mission sector 134, hit the following keys to set the course for the Enterprise: 23 ENTER 60 ENTER 70 A. The new coordinates are 3,6,21. Move another 23 units in the same direction by hitting f A...the new Enterprise coordinates are 6,12,42. Now hit B again for another Sensor Probe. The first number displayed is 338.340579. An alien vessel is fewer than 40 units away (this is a positive number). To be precise, its distance is 38.340579 units. The first digit is the vessel's I.D. number. In this case, 3 represents the Romulan warship. Note the Enterprise is not yet under attack by the Romulans. The next output (and the last since it is negative) is -71.561163 is again the distance of the closest vessel more than 40 units away. Finally we see the Enterprise coordinate again, 6,12,42/ When the Enterprise is fighting an enemy vessel, a number of variables are used to determine the status of both ships. One very important value is the distance separating the two ships. It is probably best to be as far away from the enemy as possible when fighting it (i.e.; closer to 35) since the closer you are, the harder is the Enterprise hit by enemy fire. Then again, also keep in mind the enemy since Klingon fire is more dangerous than Vallician fire. Let us move in 5 more units by hitting 5 ENTER 60 ENTER 70 A...coordinates: 6,13,46. Now hit B, Sensor Probe. The first f value is 334.539832 (Romulan warship firing upon the Enterprise and at a distance of 34+ units), the second and last (negative sign!) is -67+ (no need to explain), and then code 1 is shown (Note: Codes are recognized easily because they are always displayed in scientific notation...the only number important is the one to the left...the exponent is not relevant). Code 1 tells us that the Enterprise deflectors have automatically turned on due to the attack of the enemy Romulan. Note that a course change can no longer be made (try inputting values and hitting A!). As captain you must immediately signal BATTLE ALERT. Do this by reading card 3. The new number displayed is 0.0030. This lets us know what ships are attacking us. In this example, the Romulan is the only one. Input now the vessel you wish to fight (first). If you input a number of a vessel not in range, code 4 will be displayed (see CODES and EXPLANATIONS). Our only choice now is the Romulan, #3 so input 3 now. The program will continue by itself. The first thing displayed is CODE 3 (this will only be displayed if we are fighting a Romulan). The Romulan cloak is being used. What does this mean? When you fire your weapons at the enemy later on, you will need to input ϕ and θ as your guesses of the angles to the enemy. Your deviation from the actual angles is a factor in how well you've hurt the enemy ship. The Romulan cloak varies these actual angles by up to 9 degrees in either direction. The cloak drains energy from the Romulan ship so that the more ~~the more~~ the angles are varied, the easier the Romulan fire is on the Enterprise. So keep in mind the angles you'll be estimating aren't necessarily the correct ones in this case!

Program Description I

Program Title	STAR TREK-ADVANCED		
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The last output from Battle Alert is the distance (rounded to a whole number)... We see here that the distance is 34.0000. Now read in card 4, shields and weapon fire. The distance is still displayed. The very first input now should be the initial setting for the shields. The shields value must not exceed 99. When selecting a shields value, consider the enemy ship, the distance, and the difference b/t the Enterprise and Enemy ship status (to be explained soon). It's probably best to start off with a relatively high value and gradually drop it every so often if you find yourself doing better. The number you will be seeing when running this program tells you much information.

It is formatted like so: D D . O S_e S_e O S_v S_v S S where D D is the distance to the enemy, S_e S_e is the Enterprise status, S_v S_v is the attacking vessel status, and S S is the value of the shields. Status of either ship is a value ranging from 0 (no damages) to 100 (vessel blown up). Your objective is to get the enemy status to 100 before the Enterprise status gets there in as few rounds of firing as possible. After the first setting of the shields, the Enterprise will be hit by enemy fire. After that, no change in status will occur following a resetting of the shields value. To set or change the shields value, simply input

the setting. After reading in card 4, hit 80... the program will continue by itself. Note the shields setting is confirmed as 80 (last two digits) and the new Enterprise status is 4. Actually this is a small change in status compared to the average enemy fire. The reason the change is so low is because the cloak is being heavily used, and the distance is the largest possible, 34. When firing weapons, two angles must be input, ϕ and θ . In this example, there are immediately

two things going against you: 1) the fact that the cloak is on heavily

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and 22) θ is calculated from the exact distance and now you are only given the distance rounded off (which could vary the angle several degrees)...this is the error in the Enterprise sensor system...it generally doesn't cause any problem. Guessing angles α is a tricky business and the hardest duty you have as Captain. Included in this game is a program on "target practice" (on card 5). Later, hints will be given on how to best estimate these two firing angles. There are two differences between phasers and photon torpedoes: 1) Photon torpedoes increase the enemy α status twice as much as would have been if phasers were fired (note: phasers: change in status=5; photon's: change in status=10.....phasers: change in status=0; photons: change in status=0) and 2) Fuel cost is 2 and 2/3 greater. Why then not fire phasers twice instead of photon torpedoes once? Because each time you fire upon the enemy they fire back and the difference in enemy and Enterprise status is an important factor in determining the new Enterprise status. Knowing exactly when to use your photon torpedoes is a skill that must be developed. It wouldn't be too difficult for the average player to quickly destroy the Romulan under these conditions. Shown below are a poor player's inputs in order to demonstrate the workings of this program. Before firing weapons, fB must be hit. The Enterprise coordinates will then be displayed (three pauses) and will be recognized as a negative number. These will alternate with the Alien coordinates (positive). To fire, simply hit θ ENTER θ and then C for phasers or D for photon torpedoes. Once an angle is input, it will be held for an extra cycle of pauses so that you need not be hurried in inputting the second angle or the firing label (C or D). For your first shot, you are given approximately 45 seconds of coordinate pausing to input your angles and fire before the enemy fires back. Each successive shot reduces the timer by 10 seconds (until 5 seconds are reached at which point you are given 5 seconds for every shot thereafter). Here now are the inputs of that poor player: (the status display is presently 34.00400080)

Weapons SB ^{STAND-BY}	Angles	New shields setting	Display
fB	-15, 80 C		34.00800080
fB	-17, 80 C		34.01300080
fB	-15, 82 C		34.01800080
		90	34.01800090
fB	-13, 78 C		34.02200190
fB	-11, 78 C		34.02700290
fB	-10, 75 C		34.03200490
fB	-10, 73 C		34.03700790
fB	-10, 73 D		34.04201390
fB	-8, 73 C		34.04701690
fB	-8, 71 C		34.05202090
fB	-8, 69 C		34.05702590
fB	-8, 67 C		34.06203190
fB	-6, 67 C		34.06703990
fB	-6, 65 C	CODE 0 displayed	34.07000090 (34.07100090)
		The sensors have been damaged...you must now continue without knowledge of the enemy's status.	
fB	-6, 65 C	CODE 0 displayed	34.07500090
fB	-6, 65 D	Enemy destroyed	-5. Actual θ
			64. Actual θ

This ends with the blinking zero. Normally the last 0. blinking digit would be the I.D. # of the alien vessel destroyed. The 0 is blinking because the sensors have been damaged. Eventually one might receive a code 5. This means the shields have been knocked out. You can either try ONE more shot to destroy the enemy (if you don't you're a dead duck!) or go immediately to card 5 for the corbomite maneuver (tricking the enemy into retreating...however, you will meet him again before the game's end). If you go to card 5 before receiving code 5, the Enterprise will self-destruct. To summarize, go on to card 5 immediately following the destruction of the enemy (blinking I.D.), after receiving code 5 and wishing to play it safe, or before receiving code 5 and wishing to blow up the Enterprise yourself. No doubt the first couple of times you fight an enemy vessel, you'll probably be blown up. It takes experience...and lots of practice to be a captain of a starship.

Back to the game. Since we have destroyed the enemy (if you haven't already done the

Program Description I

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Program Description I. After the series of keystrokes above, do so now), we can now read in card 5. The program will continue automatically and determine what to do 1) generate new coordinates for the enemy (it has retreated) 2) self-destruct or 3) none of the above--the enemy has been destroyed. In cases 1 and 3, the last output will be the Enterprise coordinates signalling you to continue on to your next mission. In this example, presetting is done quickly and the Enterprise coordinates appear in the display: 6,13,46. There are two more things to discuss. Return now to card #2 and read it in. Now hit 75, ENTER 52 ENTER 17 A for a course change...new Enterprise coordinates: 50,69,67. Now hit B, Sensor Probe. The first output is 18.055470. It is positive...but why isn't the vessel I.D. present? Because our sensors were damaged in the last battle. How does one repair the sensors? There are two ways 1)By docking at starbase (to be explained later) or 2) By destroying an enemy vessel in battle and keeping the Enterprise status under 51. In this case, repairs will be done in the program on card 5. Repairs are signalled by code 6. Back to the output 18+. Since this value is under 35, we are probably under attack (if this was the case, which it isn't, we wouldn't receive a choice of combat when we ran Battle Alert). The second output is -41+ (no need to explain). The third output is CODE -1. So we are not under attack. We are receiving communications from a stranded Nubian freighter (which is 18+ units away) (if sensors were operating, the first output would have been 118+). The fourth output is CODE 0 (reminding us that sensors are damaged). Finally the coordinates again. If a Nubian is fewer than 35 units away, the Enterprise is still capable of being moved. If both a Nubian and an enemy vessel are within range, the Nubian gets priority and must be

These figures were calculated to get the Enterprise to a specific location. For reasons of Nubian salvaging explanation.

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salvaged before going into battle with the enemy vessel. When the Nubian appears in the sensor probe, it does not have to be salvaged immediately; If you wish, you can pick it up later. Remember that towing it costs extra fuel in both movement and also when operating the shields in battle. However, it might not be convenient to go out of the way to pick it up later. The choice is yours. UNDER NORMAL CONDITIONS (SENSORS NOT DAMAGED) THE COORDINATES OF THE NUBIAN FREIGHTER WOULD BE DISPLAYED WHEN RUNNING SENSOR PROBE IF THE NUBIAN WERE FEWER THAN 35 UNITS AWAY...THE NUBIAN COORDINATE FORMAT WOULD BE 1.XXXYZZ...IT WOULD BE DISPLAYED WITH SCIENTIFIC NOTATION. With sensors damaged, you must salvage without knowing the coordinates.

Salvaging the Nubian involves beaming (transporting) the occupants aboard the Enterprise and towing the vessel with the Enterprise tractor beam. All of this can only be done when the Nubian is fewer than 10 units away. Once this is accomplished salvaging can be accomplished. Input now: ~~XYY5X~~ 10 ENTER 52 ENTER 17 A. The new Enterprise coordinates are 55, 76, 69. Check the distance to the Nubian. Hit B. The distance is now 9.48+. Close enough for salvaging operations. Once coordinates of the Enterprise are returned to the display, read in card 6. Press E. Negative Enterprise coordinates signify completion of salvaging operations and tractor beam on. Docking at Starbase is similar. The Enterprise must be fewer than 10 units away from coordinates 0,0,0. In addition, no alien vessels must be in the vicinity. If there are, code 8 will appear and you should go immediately to card 2 and run the Sensor Probe program. Such an alien vessel must be destroyed before the starbase shields are lowered. Once you are within range, go to card 6 and hit f C. The Enterprise coordinates will become 0,0,0. The Nubian will be released and out of tow. Repairs will be completed on sensors. (Note that the latter two events will occur only under the right conditions...Nubian being towed for the former, sensors damaged for the latter.). The Enterprise coordinates 0,0,0 will be displayed if you must go out again. If the three enemy vessels have all been destroyed and the Nubian freighter salvaged, code 9 will appear and the fuel will be displayed. The game is over!

TARGET PRACTICE PROGRAM--CARD 5

The two angles used in firing weapons are derived from two right angle triangles. Figure 2 shows the representation of ϕ . The side opposite to the angle is the difference in y values (enemy y value minus Enterprise y value) while the adjacent side is the difference in x values. Figure 3 shows how θ is formed in a triangle whose side opposite to the angle is the difference in z values and whose hypotenuse is the distance. The Star Trek beginner can use triangles such as these to help him estimate the firing angles. He may also choose to memorize some key ratios and corresponding angles as shown in Figure 4.

FIGURE 2

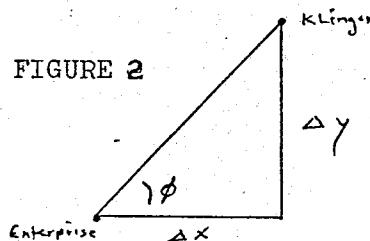
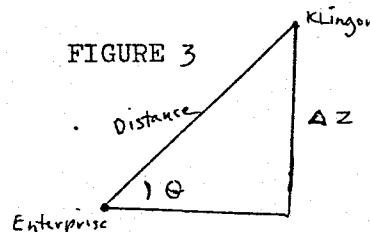


FIGURE 3

FIGURE 4
absolute value
of ΔY/ΔX ϕ absolute value
of ΔZ/D θ

0	1/4=14*	0	0
1/2	3/4=37*	26.5*	1/8
1	5/4=51*	45	1/4
3/2	7/4=60*	56*	3/8
2		63.5*	1/2
3		71.5*	5/8
4		76*	3/4
6		80.5*	7/8
10		84*	33/34°
20		87*	76*

*approximation. °largest possible angle

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Program Description I

Program Title

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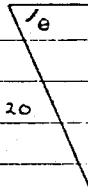
Zip Code

Program Description, STAR TREK-ADVANCED. Read card 5 in now. * Input a seed between 0 and 1 (say, .1234566789). Hit E. The first number output will be the distance between the Enterprise and the alien; in our example, it is 20.22+. The next output will be the Enterprise coordinates (negative sign). For purposes of target practice, the Enterprise coordinates will always be 50.050050 or 50,50,50. These will blink three times. The next output are the coordinates of the alien vessel; in our example, 59.048032 or 59,48,32. These, too, will blink three times. Finally, the distance is displayed again. These last three inputs will keep repeating until two angular inputs are made separated by an ENTER. Figures 5 and 6 show the triangles that would be used for these angles.

* FIRST, TURN HP-67/97 OFF, THEN ON.

$\Delta x = 9$
 $\Delta y = -2$

FIGURE 5 $|Y/X| = .222\ldots$



$\Delta z = 20$

FIGURE 6

$|Z/D| = .900$

The angles made be input during any blink.

Keep in mind that when playing Star Trek,

you see the exact distance in Sensor Probe and the "rounded-off" distance during weapon fire. Let's input as our guesses the numbers -10

Operating instructions and warnings and -60 (10 CHS ENTER 60 CHS). The next output from the program will be the correct horizontal angle (-12.5+). Following this will be the correct vertical angle (-62.8+) and finally --how far off we were--(5.4+). A new problem is then generated and you can try again!

---SHIELDS AND WEAPON FIRE FUEL COST AND STATUS CHANGE---

The fuel needed for the shields is equal to twice the value set for the shields (three times the value if you are towing the Julian freighter).

This program has been verified only with respect to the numerical example given in Program Description II. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Hence, if the shields setting is 75, the fuel cost is 150 (225 if the Nubian is being towed... The Enterprise must provide extra shields protection for this ship). Phasers require 3 times the distance in fuel units while Photon Torpedoes require 8 times the distance (rounded off). Shields and firing fuel drain is calculated each time the weapons are fired.

Here are the formulae used for calculating change in enemy and Enterprise status:

$$\Delta S_e = \text{INT} \left\{ \frac{(6-I)(10000)(S_e - S_v + 100)^2}{(D)(10 \times S)^2} \right\}$$

$$\Delta S_v = \text{INT} \left\{ \frac{((0.1 - 0.03^* \text{LN}(A)))(S_v - S_e + 100)^2 (W)}{D} \right\}$$

*To make the game more challenging, this number can be changed to $-0.04(\text{LN}(A))$. See program step # 111 on card # 4.

WHERE:

ΔS_e = the CHANGE in Enterprise Status

ΔS_v = the CHANGE in Attacking Vessel Status

I = the I.D.# of the attacking Vessel (2 for the Klingon, 3,4,or5 for the Romulan* and 4 for the Vallician)

S_e = ENTERPRISE STATUS

S_v = ATTACKING VESSEL STATUS

D = Distance (rounded to a whole number)

S = The shields setting

LN = Natural log

A = the SUM of the ABSOLUTE VALUES of the DIFFERENCES of the two guessed angles and the two correct angles
 $(|\theta_{\text{guess}} - \theta_{\text{correct}}| + |\theta_{\text{guess}} - \theta_{\text{correct}}|)$

W = 1 for Phasers and 2 for Photon Torpedoes

*The more the Romulan cloak is used, the higher is the value of the I.D.# and the lower is the change of Enterprise Status for any set of values.

A rare occurrence: Should the positions of the enemy and the Enterprise happen to be such that the two firing angles can be deduced exactly (for example Enterprise=15,15,15; Enemy= 15,45,15; $\phi = 90$, $\theta = 0$), you should input one angle with an added error (for example, input 0.001 instead of 0.000) since two correct inputs would cause an error display when the calculator tries to compute $\text{LN}(A)$ (see S_v formula above).

Should you know the vertical angle to be 90 degrees, inputting 0 and 90 as the angles would cause an error display. Rather input 0.001 and 90 or 0.000 and 90.001.*

*Recall that if $\theta = 90$ degrees, the calculator sets ϕ equal to 0.

Program Description II

Sketch(es)

CODES AND EXPLANATIONS

All codes are displayed in scientific notation.
 The number to the left is relevant...the exponent to the right is not.

Sample Problem(s)

CODE #	EXPLANATION
0	Sensor system damaged from enemy phaser attack.
1	Deflectors on--Enterprise under attack.
-1	Enterprise receiving communication from Nubian freighter. It is stranded and requires assistance.
2	Docking at Starbase 0 completed.
3	Romulan warship employing the cloaking device.
4	Alien vessel out of range.
5	Enterprise shields knocked out.
6	Sensor system repairs completed
7	Enterprise out of range (for TTB, docking, etc...)
8	Alien vessel in the area. Starbase 0 will not lower their shields to allow the Enterprise to dock.
9	GAME OVER

Solution(s)

-9	Enterprise on SELF-DESTRUCT (3 second countdown).
9.99999999 99	Enterprise destroyed by enemy vessel.

Reference(s)

CARD # 1

STAR TREK ADVANCED

1 COURSE —

f-steady f weaponsSB f dock [REDACTED] f INIT
-change sensors phasers photon t T/TB-pr.

User Instructions

COURSE CONTROL/SENSOR SYSTEM

1 COURSE--
f-steady
-change sensors

User Instructions

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CARD # 3

BATTLE ALERT

1

2

SHIELDS/WEAPON FIRE

1

四

2

10

fWEAPONS

PHASERS PHOTON T

POST-FIRING OPERATIONS/PRACTICE

1

2

Practice

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Load sides 1 and 2.			
2	To practice go to step 5.			
3	To reset, employ corbomite maneuver, or			Enterprise
6	self-destruct, do nothing			Coordinates
			RESET	RESULTS: " "
				CORBOMITE RESULTS: " " "
				SELF-DESTRUCT
				-9. 00
				3
				2
				1
				Code destruct.
4	To continue, go to card 31 for LRTS or card 2 for course control. If an enemy ship is still in vicinity, go to card 3.			
5	PRACTICE Input a seed between 0 & 1 S		E	Distance
5A	Input two angles (guesses)	Ø Ø	ENTER	Enterprise coordinates
6	Go to step 5A			Enemy coordinates.
				Distance.
				correctØ
				correctØ
				Accuracy

User Instructions

TTB/Docking

f DOCK

TTB

Program Listing 1

Program 1

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00369D

KEY ENTRY

KEY CODE

001 GT0d
002 *LBLe
003 CLRG
004 STOB
005 4
006 STOI
007 1
008 ST07
009 *LBL0
010 6
011 ST06
012 STOA
013 RCLI
014 1
015 X=Y?
016 SF0
017 *LBL1
018 GSB9
019 EEX
020 2
021 X
022 INT
023 STOB
024 F0?
025 GSB5
026 RCLB
027 EEX
028 2
029 +
030 RCL6
031 10^x
032 ÷
033 ST+1
034 3
035 ST-6
036 RCL6
037 8
038 X=Y?
039 GT01
040 RCLI
041 F0?
042 ST+9
043 EEX
044 7
045 ÷
046 ST+1
047 DSZI
048 STOB
049 2
050 5
051 0
052 CHS
053 ST06
054 P+S
055 CLRG
056 *LBLd

COMMENTS

If program is running, go to L.R.T.S.
Initialize
Store seed
Set damage off
Random ship
Nubian coordinates?
Setting to store in R39
Nubian?
Yes - Add to R39
random coordinate
Position coordinate
New coordinate
Add ID of ship
set Fuel = -250 so
that LRTS run
costs no fuel.
Long range tracking system
(LRTS)

STEP

KEY ENTRY

057 P+S
058 *LBL2
059 GSB9
060 4
061 X
062 1
063 +
064 INT
065 STOI
066 RCLI
067 EEX
068 3
069 X=Y?
070 GT02
071 R↓
072 X<0?
073 GT02
074 STOA
075 CLX
076 STOB
077 3
078 STOI
079 *LBL3
080 RCLA
081 INT
082 EEX
083 2
084 -
085 2
086 5
087 ÷
088 1
089 +
090 INT
091 RCLI
092 1
093 -
094 10^x
095 RCLX
096 RCLB
097 +
098 STOB
099 RCLA
100 FRC
101 EEX
102 3
103 X
104 STOA
105 DSZI
106 GT03
107 2
108 5
109 0
110 ST+6
111 RCLB
112 P+S

KEY CODE

COMMENTS

Random #
Random ship
Already destroyed?
New random ship
Towed Nubian?
New random ship
Position in mission sector
Position in mission sector
Add 250 to FUEL
mission sector

REGISTERS

	1	2	3	4	5	6	7	8	9
Seed	S1 Nubian	S2 KLingen	S3 Romulan	S4 Vulcanian	S5 Enterprise	S6 Coordinates/ Fuel	S7 Damaged Opp. crew	S8 Ships in vicinity	S9 Nubian
Counter for Destroyed Registers S1, Registers	B	used / mission sector	C		D		E	I counter	

00369D

Program Listing II

Program 1 Page 19 of 29

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LABELS

FLAGS

SET STATUS

Program Listing I

-Program 2

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL1			057	INT		
002	FIX			058	P±S		
003	P±S			059	ST+6		
004	RCL1			060	RCL5		
005	ENT↑			061	P±S		
006	ABS			062	R↓		
007	÷		Nubian towed? If yes (n,<0) Make enterprise negative.	063	*LBL0		
008	RCL5			064	R↑		
009	P±S			065	ENT↑		
010	X			066	FRC		
011	*LBL8			067	EEX		
012	PSE			068	3		
013	GT08			069	X		
014	*LBLA			070	X±Y		
015	ST06	Θ		071	INT		
016	R↓			072	RCL1		
017	ST0C	Φ		073	+		
018	X±Y			074	INT		
019	ST04	R		075	X<0?		
020	RCL6	Θ		076	GT01		
021	SIN	SIN Θ		077	EEX		
022	RCL4	R		078	2		
023	X	R sin Θ		079	X±Y?		
024	ST01	ΔZ		080	GT01		
025	RCL6	Φ		081	X±Y		
026	COS	COS Θ		082	RCL6		
027	RCL4	R		083	10 ^X		
028	X	R cos Θ		084	÷		
029	ST06	Φ		085	ST+7		
030	RCLC	SIN Φ		086	3		
031	SIN	R COS Θ		087	ST+6		
032	RCL6	R COS Θ SIN Φ		088	DSZI		
033	X	R COS Θ SIN Φ		089	GT00		
034	ST02	ΔY		090	RCL7		
035	RCLC	Φ		091	P±S		
036	COS	COS Φ		092	ST05		
037	RCL6	R COS Θ		093	P±S		
038	X	R COS Θ COS Φ		094	GT01		
039	ST03	ΔX		095	*LBLB		
040	*LBLA			096	CLX		
041	GSB7	Check for ship in vicinity		097	P±S		
042	3			098	ST08		
043	ST01			099	RCL6		
044	P±S			100	Pi		
045	RCL1	Nubian		101	+		
046	P±S			102	5		
047	6			103	YX		
048	ST06			104	FRC		
049	ST07			105	ST08		
050	X±Y?	Nubian Towed?		106	RCL7		
051	1	Yes - Fuel cost = 6 x R		107	P±S		
052	ENT↑	No - Fuel cost = 5 x R		108	SCI		
053	5			109	X=0?		
054	+			110	PSE		
055	RCL4			111	FIX		
056	X	Fuel cost		112	EEX		

REGIS. L.I.S.										
I.D.	1 ΔZ	2 ΔY	3 ΔX	4 R	5	6 Θ / Regis coordinates	7 E.L.C.L. New Enterprise Coordinates	8	9	
0	S1 Seed	- Nubian	S2 Klingon	S3 Romulan	S4 Vulcian	S5 Enterprise	S6 Fuel	S7 Damaged enem. capts!	S8 ships in vicinity	S9 Nubian
	B	Used for counter	C Φ		D I.D. Nubian coordinates	E		I Counter		

00369D

Program Listing II

Program II

EP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS	
	113	3			169	X \neq Y?	Close enough for battle	
	114	ST08			170	GT06	No	
	115	R1	Random #		171	RCLO	Ship I.D.	
	116	4			172	ENT1		
	117	X			173	10X		
	118	1			174	=		
	119	+			175	P \neq S	Add to "ships in vicinity" register	
	120	INT			176	ST \neq 8		
	121	ST00			177	P \neq S		
	122	ST08			178	*LBL6		
	123	*LBL2			179	GSBe	print distance with w/o I.D.	
	124	RCLO			180	*LBL5		
	125	ST01			181	ISZI	Increment Register O	
	126	P \neq S			182	5		
	127	RCLO	Nubian coordinates (XX,YY)ZZ		183	RCLO		
	128	RCLO	Enterprise coordinates (XX,YY)ZZ		184	X=Y?	R ₀ = 5?	
	129	P \neq S			185	1	Yes - Set it to 1.	
	130	-			186	ST00		
	131	3			187	RCLO	Value marking end of loop.	
	132	ST01			188	X \neq Y?		
	133	CLK			189	GT02		
	134	ST07			190	RCLO	SMALLEST D > 40	
	135	R4			191	CHS		
	136	*LBL3			192	PRTX		
	137	ENT1			193	GSB7	check for ships in vicinity	
	138	INT			194	GT01		
	139	EEX	C = X, Y, or Z		195	*LBL7		
	140	2			196	P \neq S		
	141	-			197	RCLO	ships in vicinity	
	142	X ²			198	P \neq S		
	143	ST+7			199	X=0?	No ships around	
	144	R↓			200	RTN	Return	
	145	FRC			201	.		
	146	EEX			202	1		
	147	3			203	SCI		
	148	X			204	X \neq Y?	Nubian in vicinity?	
	149	DSZI			205	CHS	Yes - DSP code - i	
	150	GT03			206	PRTX	No - DSP code i	
	151	ST00	I.D.		207	X \neq 0?	Nubian in vicinity?	
	152	RCLO	$(X-X_c)^2 + (Y-Y_c)^2 + (Z-Z_c)^2$		208	GT01	No - Return	
	153	JX	Distance		209	P \neq S	Yes - Show Nubian coordinates	
	154	ST06			210	RCLO	Nubian coordinates	
	155	4			211	P \neq S		
	156	0			212	ST00		
	157	XXY?			213	CLK		
	158	GT04			214	ST06		
	159	CLK			215	*LBL6	Print Nubian coordinates or code 000	
	160	RCLO			216	P \neq S		
	161	XXY?			217	RCLO		
	162	X \neq Y			218	P \neq S		
	163	ST08	SMALLEST D > 40		219	X \neq 0?	Sensor check?	
	164	GT05			220	RCLO	I.D./Nubian coordinates	
	165	*LBL4			221	RCLO	Distance / 0	
	166	CLK			222	+		
	167	3			223	PRTX		
	168	5			224	RTN		
			LABELS		FLAGS		SET STATUS	
			D	E	0	FLAGS	TRIG	DISP
1 COURSE CHANCE	B	Sensor Probe	C	D	1	ON OFF		
1 COURSE STEADY	B		C	d		0 <input type="checkbox"/> <input type="checkbox"/>	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
	1		2	3	4	1 <input type="checkbox"/> <input type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
	6		7	8	9	2 <input type="checkbox"/> <input type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
						3 <input type="checkbox"/> <input type="checkbox"/>		n <input type="checkbox"/>

Program Listing 1

- Program 3

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KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	P#3			057	FRC	
002	RCL8	ships in vicinity		058	EEX	
003	P#3			059	3	
004	1			060	X	
005	0			061	DS21	
006	X			062	GT02	
007	INT			063	RCL8	Distance to Alien
008	X=0?	Nubian in vicinity?		064	JX	
009	GT08	No - GT0 LBL 00		065	ST08	
010	CHS	YES - Display code - 1		066	3	
011	SCI			067	5	
012	GT06			068	X#Y?	
013	*LBL0			069	GT03	Yes - Continue
014	P#3			070	4	No - Display code 4
015	RCL7	Damages?		071	SCI	
016	X=0?			072	PRTX	
017	GT09	Yes		073	FIX	
018	RCL8	ships in vicinity		074	GT08	Redisplay ships in vicinity
019	P#3			075	*LBL3	
020	*LBL1			076	RCL2	AY
021	PSE			077	RCL3	AX
022	F3?	Ship chosen?		078	FP	
023	GT07	Yes...Leave Loop		079	R↓	
024	GT01			080	ST06	Φ
025	*LBL7			081	RCL1	ΔZ
026	INT			082	RCL8	D
027	ABS			083	Δ	ΔZ/D
028	5	check for error input		084	SIN-1	e
029	X#Y?			085	ST07	
030	GT08			086	RCL8	
031	X#Y			087	INT	
032	ST08	Ship I.D.		088	ST08	
033	ST01			089	RCL5	
034	P#3			090	1	
035	RCL1			091	0	
036	RCL5			092	0	
037	P#3			093	1	
038	X#Y			094	1	
039	ST05			095	0	
040	X#Y			096	0	
041				097	1	
042	3			098	-	
043	ST01			099	ST05	Alien coordinates
044	CLX			100	RCL8	ΔZ I.D.
045	ST08			101	ENT†	
046	R↓			102	16*	
047	*LBL2	Determine distance		103	Δ	
048	ENT†			104	P#3	
049	INT			105	ST-8	Subtract from
050	EEX			106	P#3	ships in vicinity.
051	2			107	RCL8	I.D.
052	-			108	ST01	
053	ST01			109	3	
054	X#			110	X#Y?	Romulan vessel
055	ST+8			111	GT04	No
056	R↓			112	SCI	Yes - Empower Romulan CLK

REGISTERS

I.D.	1 VARIABLE I.D.	2 ΔZ	3 ΔY	4	5 Alien coordinates	6 Δ	7 Δ	8 Distance	9
old	S1 Nubian	S2 Klingon	S3 Romulan	S4 Vullian	S5 Enterprise	S6 Fuel	S7 Damages?	S8 ships in vicinity	S9 Nubian
	B	C		D	E		I		Counter

Program Listing II

- Program 3

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00369D

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	PRTX		Print code 3	169	ENT†		
114	FIX			170	INT		
115	GSB5			171	X#0?		A ship in vicinity?
116	ST+6		Δ φ	172	GT07		Yes... continue
117	ABS			173	R↓		No... continue
118	GSB5		Δ θ	174	DS21		
119	ST+7			175	GT06		
120	ABS			176	SCI		
121	+		Total angular change.	177	4		
122	.		Determine change in I.D.	178	GT06		
123	1		to lessen brunt of	179	R/S		
124	5		Romanian Attack (determined	180			
125	X		by how much energy is used				
126	.		for the cloak - Magnitude				
127	2		of $ Δ\phi + Δθ $				
128	1						
129	-						
130	INT						
131	ST+1						
132	*LBL4						
133	RCL8		Distance				
134	*LBL5						
135	PSE						
136	GT06						
137	*LBL5		Δφ or Δθ				
138	P#S						
139	RCL0						
140	PI						
141	+						
142	5						
143	YX						
144	FRC						
145	ST00						
146	P#S						
147	2						
148	6						
149	X						
150	1						
151	6						
152	-						
153	INT						
154	RTN						
155	*LBL9		Sensors damaged.				
156	SCI		Determine <u>first</u> ship in				
157	4		vicinity.				
158	ST01						
159	CLK						
160	PRTX						
161	FIX						
162	RCL8						
163	P#S						
164	*LBL5						
165	FRC						
166	1						
167	6						
168	X						

LABELS

LABELS				FLAGS	SET STATUS		
B	C	D	E	0	FLAGS	TRIG	DISP
b	c	d	e	1	ON OFF	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
1	/	2	/	3	1	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
/	/	/	/	4	2	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
✓	✓	✓	✓	✓	3	3	n <u>4</u>
					input flag		

Program Listing 1

Program 1

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0369D

KEY ENTRY KEY CODE

COMMENTS

STEP KEY ENTRY

KEY CODE

COMMENTS

001	EEX			058	*LBLb		
002	2			059	F0?		
003	ST0E			060	RTN		
004	CLX			061	DSP6		
005	ST0A			062	SF0		
006	ST03			063	RCL2		
007	ST04			064	2		
008	1			065	-		
009	2			066	X#0?		
010	ST02			067	ST02		
011	*LBL0			068	RCL2		
012	CF0			069	ST0I		
013	CF1			070	*LBL2		
014	RCL8			071	P#S		
015	RCL3			072	RCL5		
016	EEX			073	P#S		
017	3			074	CHS		
018	÷			075	GSB3		
019	+			076	RCL5		
020	F#S			077	GSB3		
021	RCL7			078	GT02		
022	P#S			079	*LBL0		
023	ST03			080	SF1		
024	SCI			081	*LBLC		
025	X=0?			082	F0?		
026	PRTX			083	ST0E		
027	RCL4			084	ST00		
028	X			085	*LBL6		
029	EEX			086	RCL7		
030	6			087	-		
031	÷			088	ABS		
032	+			089	X#Y		
033	RCL8			090	RCL6		
034	EEX			091	-		
035	8			092	ABS		
036	÷			093	+		
037	+			094	ST0B		
038	FIX			095	6		
039	DSP8			096	F1?		
040	*LBL9			097	5		
041	CF3			098	ENT1		
042	PSE			099	3		
043	F3?			100	+		
044	GT01			101	RCL8		
045	GT09			102	X		
046	*LBL1			103	P#S		
047	RCL8			104	ST+6		
048	X#Y?			105	P#S		
049	GT08			106	2		
050	X#Y			107	RCLB		
051	ST0A			108	LH		
052	F2?			109	-		
053	GT04			110	0		
054	RCL3			111	3		
055	RCL3			112	CHS		
056	SCI						
057	GT05						

REGISTERS

I.D.	various I.D. various I.D.	12 Firing Time Counter	3 Enterprise status S _E	4 Attacking vessel status S _V	5 Alien coordinates	6 ϕ	7 θ	8 Distance	9 Damages?
SO Seed	S1 Nubian	S2 KLingen	S3 Romulan	S4 Vulcian	S5 Enterprise	S6 Fuel	S7 Damages! ON=0; OFF=1	S8 ships in vicinity	S9 Nubian
A Shields	B $10\phi + 10\theta$	C	D	E	100	F	I Counter		

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	X	-	-.03 LN(A)	169	GSB8		$(G-I)(10^4)(S_E - S_V + 100)^2$
114	.	-		170	RCLA		Shields(s)
115	I			171	1		
116	+		J - .03 LN(A)	172	0		
117	RCL4	S _V		173	X		$10 \times S$
118	RCL3	S _E		174	X ²		$(10 \times S)^2$
119	GSB8	$[0.1 - .03 \ln(A)] [S_V - S_E + 100]^2$		175	÷		$(G-I)(10^4)(S_E - S_V + 100)^2$
120	F1?	Photon Torpedoes? D		176	INT		$(D)(10 \times S)^2$
121	X	Yes - multiply by 2.		177	ST+3		ΔS_E
122	X ² ?	$\Delta S_V < 0$		178	RCL3		S _E
123	GT04	Yes ... Don't change S _V .		179	ROLE		
124	INT			180	KEY?		$S_E \geq 100?$
125	ST+4			181	H!		Yes - Enterprise destroyed.
126	RCL4			182	CLX		
127	ROLE			183	7		
128	X>Y?	$S_V \geq 100?$		184	8		
129	GT04	No - Continue		185	X>Y?		$S_E < 70?$
130	1	Yes - Signal destruction at alien		186	GT05		Alien Yes - continue
131	GHS			187	CLX		No - Sensors damaged
132	STX5	Make Alien coordinates negative		188	P ² S		
133	DSP0			189	ST07		
134	RCL6	Φ		190	P ² S		
135	PSE			191	*LBL5		
136	RCL7	Θ		192	CLX		
137	PSE			193	8		
138	RCL8	I.D.		194	5		
139	RCL9	IF Damaged, equal to 0 - otherwise = 1		195	X>Y?		$S_E < 85?$
140	X			196	GT08		Yes - continue
141	GT09	Display I.D. or 0.		197	CLX		No - shields out
142	*LBL4	Alien fire		198	ST08		
143	SCI			199	5		
144	P ² S			200	ENT†		
145	RCL1	Nubian		201	PRTX		Display code 5
146	0			202	GT00		
147	X>Y?	Nubian touch?		203	*LBL3		
148	1	Yes - Fuel cost = 3 x Shields		204	PSE		
149	ENT†			205	PSE		
150	2	No - Fuel cost = 2 x Shields		206	PSE		
151	+			207	DZI		Time out?
152	RCLA	Shields		208	GT07		No - continue
153	X	Fuel cost		209	GT04		Yes - Alien Fire
154	ST+6			210	*LBL7		Angle input?
155	P ² S			211	F3?		Yes - leave angle in Display
156	6			212	GT03		No - Display other coordinates
157	RCL1	I.D. (I)		213	RTH		
158	-	6-I		214	*LBL8		
159	EEX			215	-		
160	4	$(G-I)(10^4)$		216	ROLE		
161	X			217	+		
162	RCL3			218	X ²		
163	8			219	X		
164	5			220	RCL8		
165	X>Y?	Shields out?		221	÷		
166	H!	Yes - Enterprise destroyed		222	RTH		
167	CLX			223	R/S		
168	RCL4						

LABELS

0 Routine report check

FLAGS

SET STATUS

B	C	D	E	FLAGS	TRIG	DISP
Dwarpens Standby	C	D	E	1 Phasers/ Photon Torpedoes	ON OFF	DEG <input checked="" type="checkbox"/> SCI <input type="checkbox"/>
✓	✓	✓	✓	2 First time - alien ARND FCT	1 <input type="checkbox"/> <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/>	GRAD <input type="checkbox"/> RAD <input type="checkbox"/>
✓	✓	✓	✓	3 INPUT check	2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>	ENG <input type="checkbox"/> n <input checked="" type="checkbox"/>

Program Listing 1 - Program 5

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0-0 369 D

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	SCI			059	ST+5		
002	RCL5		Alien coordinates	059	RCL5		
003	X<0?		Less than 0 (destroyed)?	060	P#5		
004	GT08		Yes... continue	061	ST01		Replace old Alien
005	3		No... check for Retreat	062	P#5		coordinates with new.
006	ST01			063	CF0		
007	8			064	7		Flag off - Alien not destroyed.
008	ST05			065	ENT↑		
009	RCL3		SE	066	PRTX		
010	8			067	GT04		Display code ?
011	5			068	*LBL0		
012	X#Y?		Illegal retreat (SE < 85)?	069	P#5		Check for Sensor Repairs
013	GT01		No... continue	070	RCL7		
014	DSPO		Yes... self-destruct	071	P#5		
015	CHS			072	X#0?		No damages?
016	ENT1			073	GT04		None... continue
017	PRTX		Display code 0 - 9	074	RCL3		SE
018	FIX			075	5		
019	*LBL2			076	1		
020	RCLI			077	X#Y?		SE > 50
021	PSE			078	GT04		Yes... No Repairs.
022	DSZI		Countdown.	079	P#5		No... Repairs
023	GT02			080	1		
024	EEX			081	ST07		
025	2			082	P#5		
026	NI		Enterprise destroyed.	083	6		
027	*LBL1		Legal retreat... New Alien	084	ENT↑		
028	P#5		coordinates.	085	PRTX		
029	RCL6			086	*LBL4		Display code 6
030	PI			087	FIX		
031	+			088	RCL6		
032	5			089	CLRG		I.D.
033	YX			090	P#5		
034	FRC			091	ST01		
035	ST08			092	EEX		
036	P#5			093	3		
037	EEX			094	F#?		
038	2			095	ST01		Alien destroyed?
039	X			096	RCL1		Yes - STORE 1000
040	LISTX			097	ENT↑		
041	+			098	ABS		
042	INT		coordinate	099	÷		
043	RCLI			100	RCL5		
044	1			101	X		
045	-			102	P#5		
046	3			103	*LBL5		
047	X			104	PSE		
048	10 ^Y			105	GT05		
049	÷			106	*LBL6		Practice
050	ST+5			107	CF3		
051	DSZI			108	CLRG		
052	GT01			109	ST08		
053	RCL8			110	5		
054	ST01			111	0		
055	EEX			112	.		
056	7						

REGISTERS

1	2	3	4	5 (new) Alien coordinates	6	7	8	9 Practice Alien coordinates
1. D / seed	1 $\Delta X (x-z)$	2 $\Delta Y (y-z)$	3 $\Delta Y (y-z)$	4 Y	5 (new) Alien coordinates	6 Z	7 Δ	8 Θ
S1 Nubian	S2 Klingon	S3 Romulan	S4 Vulcian	S5 Enterprise	S6 Fuel	S7 Damages CF = 1, 1000	S8 ships in vicinity	S9 Nubian
-50.050050	B Distance	C	D	E	F	G	H	I Counter

Program Listing II - Program 5

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	0			169	#LBL6		
114	5			170	RCL1		
115	6			171	RCL1		
116	8			172	1		
117	5			173	.		
118	CHS			174	5		
119	ST0A		Enterprise coordinates	175	x		
120	*LBL5			176	3		
121	6			177	-		
122	ST0I			178	10 ^x		
123	*LBL3			179	- ^y		
124	RCL0			180	+		
125	PI			181	DSZI		
126	+			182	DSZI		
127	5			183	GT06		
128	GT YX			184	ST09		Alien coordinates
129	FRC			185	*LBL7		
130	ST06			186	RCL4		Enterprise
131	4			187	PSE		
132	1			188	PSE		
133	x			189	PSE		
134	3			190	F3?		Angle input?
135	0			191	GT08		Yes
136	+			192	RCL9		Alien
137	INT			193	PSE		
138	ST0I			194	PSE		
139	DSZI			195	PSE		
140	GT5			196	F3?		
141	0			197	GT08		
142	-			198	RCL6		Distance
143	ST0I			199	PSE		
144	DSZI			200	F3?		
145	GT03			201	GT08		
146	RCL3		ΔY	202	GT07		
147	RCL1		ΔX	203	*LBL8		
148	+P			204			
149	R4			205	RCL7		Φ ACTUAL
150	ST07		Φ	206	PRTX		
151	RCL5		ΔZ	207	-		
152	RCL5			208	ABS		
153	X2			209	X \pm Y		Φ GUES
154	RCL3		ΔY	210	RCL8		Φ ACTUAL
155	X2			211	PRTX		
156	RCL1		ΔX	212	-		
157	X2			213	ABS		
158	+			214	+		
159	+			215	PRTX		
160	JK		Distance	216	GT09		
161	ST08			217	R/S		
162	PRTX			220			
163	-						
164	SIN ⁻¹		θ				
165	ST08						
166	6						
167	ST0I						
168	0						

LABELS

FLAGS

SET STATUS

B	C	D	E	Practice	0 Alien Destruction	FLAGS	TRIG	DISP
b	c	d	e		1	ON OFF	DEG	FIX <input checked="" type="checkbox"/>
✓ 1	✓ 2	✓ 3	✓ 4	✓ 5	✓ 6	0 <input checked="" type="checkbox"/> <input type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
✓ 6	✓ 7	✓ 8	✓ 9	✓ 10	✓ 11	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>

INPUT CHECK

n 6

Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL0			057	DS21		
002	FIX			058	1		
003	P#S			059	RCL6		
004	RCL1			060	X#Y?		
005	ENT1			061	GT04		
006	ABS			062	F#S		ALL ALIENS out of range.
007	4			063	EEX		
008	RCL5			064	3		
009	P#S			065	RCL1		
010	X			066	X#0?		Nubian towed?
011	*LBL1			067	R+		YES - STORE 1000.
012	PSE			068	ST01		
013	GT01			069	2		
014	*LBL0		TTG (Transport/tractor beam)	070	ENT1		
015	P#S			071	FRTX		Display code 2
016	RCL1			072	0		
017	GSB2		Check distance to Nubian	073	ST05		Enterprise coordinates = 0.0.0
018	GSB5		D<10?	074	4		
019	P#S		Yes	075	ST01		
020	RCL1			076	RCL7		
021	CHS			077	X#0?		Damages?
022	ST01			078	GT07		No ... continue.
023	.			079	1		
024	1			080	ST07		Repair
025	ST-S		Cancel from ships in vicinity	081	6		
026	P#S			082	ENT1		
027	GT08			083	PRTX		Display code 6
028	*LBL0		Docking and Repairs.	084	*LBL7		
029	P#S			085	RCL1		Check for game over
030	1			086	EEX		
031	0			087	3		
032	0			088	X#Y?		game over?
033	.			089	GT08		No ... continue.
034	1			090	DS21		
035	0			091	GT07		
036	0			092	DS08		Yes.
037	1			093	9		
038	GSB2		check distance to Starbase.	094	ENT1		
039	GSB5		D<10?	095	PRTX		Display code 9
040	4		Yes	096	FIX		
041	ST08			097	RCL6		FUEL
042	*LBL4		Check for other aliens around starbase.	098	R/S		END
043	RCL6			099	*LBL8		
044	ST01			100	F#S		
045	F#S			101	GT08		
046	RCL1			102	*LBL2		Distance
047	SSB2		check distance to Alien	103	RCL5		
048	4			104	-		
049	0			105	F#S		
050	X#Y?		out of range?	106	3		
051	GT06		Yes ... continue.	107	ST01		
052	8			108	CLA		
053	ENT1			109	ST07		
054	FRTX			110	R+		
055	ST08			111	*LBL3		
056	*LBL6			112	ENT1		

REGISTERS

	1	2	3	4	5	6	7	8	9	
0	Seed	S1 Nubian	S2 Klingon	S3 Romulan	S4 Vulcian	S5 Enterprise	S6 Fuch	S7 Damages! inc. CFF=1	S8 ships in vicinity	S9 Nubian
		B		C		D		E	I counter	

Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS	
113	INT			170				
114	EEX							
115	2							
116	-							
117	X ²							
118	ST+7							
119	R4							
120	FRC							
121	EEX							
122	3							
123	X			180				
124	DSZI							
125	GT06							
126	RCL7							
127	JX							
128	RTN							
129	*LBL5							
130	SCI							
131	1							
132	6							
133	X0V5			190				
134	RTN							
135	7							
136	ENT1							
137	PRTA							
138	GT06							
139	R45							
140				200				
150								
160				210				
170								
180				220				
190								
200								
210								
220								
LABELS					FLAGS		SET STATUS	
A	B	C	D	E	0	FLAGS	TRIG	DISP
a	b	c	d	e	1	ON OFF		
0	1	2	3	4	2	0 <input type="checkbox"/> <input type="checkbox"/>	1 <input type="checkbox"/> <input type="checkbox"/>	2 <input type="checkbox"/> <input type="checkbox"/>
5	6	7	8	9	3	3 <input type="checkbox"/> <input type="checkbox"/>	DEG <input type="checkbox"/>	FIX <input type="checkbox"/>
							GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
							RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
							n <input type="checkbox"/>	