01220C

PROGRAM DESCRIPTION I

Program Title WARS

Contributor's Name Peter J. Foster

Address 11 Stoneville Rd,

City Stoneville **State/Country** Western Australia **Zip Code** 6554

Program Description, Equations, Variables This programme is my idea of "STAR TREK".

All commands are given through the local alpha lables A to J.

A -Position of ship
B -Ship's power + countdown
C -Scan for enemy
D -Number of enemies left to kill + torpedoes left
E -Shield control
F -Phasor control
G -Torpedo control
H -Base tries to transfer you to itself
I -Impulse control
J -Warp control.

Also beware of roaming BLACK HOLES and SPACE STORMS. These pose a fair strain on the ship's shields,which if not maintained can collapse and leave the ship open to destuction.

Around the end of your time limit a time gate opens outside the known universe and if found can reset your time.

Necessary Accessories Four memory moduals or a HP41CV Card reader handy.

Operating Limits and Warnings None

Reference(s) My own imagination.

Description of the Universe

The universe consists of two parts; the known part of the universe and the unknown part.

The known universe is a square of 10,000 sectors (sides are of length 100). Similar to a road map, the universe has been cut up into sections called quadrants. These quadrants contain 100 sectors (10 by 10 square) such that the known universe is a 10 by 10 square of quadrants. To find any point in the known universe you need to find what quadrant it is in and the sector it is on within the quadrant. It is done the same as looking up a point on a x,y linear graph. To make the game easy to play two maps can be drawn. Both are identical but serve TWO different functions. One is used to track andlocate your base and enemy while the other is used to plan your attacks and docking/procedures.

Within this universe and outside it rage terrible space storms. When you pass through one 'SPACE STORM' will be displayed. During a storm damage is done to the ship and its shields. If the shields are strong the ship will survive, but damage may still be done to the various controls you have. If you try to use a damaged control you will be told 'DAMAGE'. Your crew work hard to repair all damage but it takes either a few moves to fix it or a docking at a star base. Except when docking, you will be told once a control is fixed. If both your impulse and warp drive are helpless then you have no alternative but to call the base for help by pushing (H).

Black holes roam about and are capable of drawing you in and ejecting you out at another point in space. They are simply powerful gravitational tunnels. They are a massive strain on the ship's shields and may collapse them and you as well. They are unseen until you are in one which displays 'BLACK HOLE'.

Outside the known universe lays a tremendous waste of space where there is no computer charts. The navigational computer has a fit trying to find out where you are, so it finally will come up with 'LOST'; it will also say other things with this:-

'U' - You are up above the known universe
'D' - You are down below the known universe
'L' - You are to the left
'R' - You are to the right

Knowing this you should be able to guide your ship back into the known universe.

It is generally a waste of time going there until you have only ten years (staryears) to go in your mission. Then a time gate opens and if you are quick you can get through it and have your time reset. While lost and have ten or less years to go a message of 'GATE' appears after your lost message. It is followed by a few helping hints to the time gate's position. If you occupy the same quadrant as the time gate you automatically feel its effects. If you are next to it you are told 'CLOSE'. If you are 2 quadrants away you are told 'NEAR'. Otherwise you are told 'FAR' with a rough guess of a distance. Failure to find it could be the end of you.

Description of Ship

The starship you have is to your own imagination. To serve you there are 12 controls to help you control her. They are the local alpha lables A to J. Here is a list of their functions.

(A) gives you the current position of the ship. Of the form 'QD: x,y Sect. x,y' See description of universe for explanation.

(B) gives the ship's power and a time count down to end of the mission at which time the ship is destroyed if mission is not completed. Mission also ends if power runs out. Power starts at 3000, time at 50.

(C) gives a scan readout for an exact radius of 3 quadrants around the ship. Displays 'CONTACT x,y' if enemy is within that radius, 'AT SECT. x,y' if within same quadrant. Gives 'BASE CLOSE' if base is in an adjacent quadrant, and 'BASE AT SECT. x,y' if in same quadrant. If all clear, displays 'SCAN CLEAR.'

(D) gives number of your enemies left to kill and the number of torpedoes left to fire.

(E) gives first the current power in the shields. To put more in the shields input a number and push (r/s) and that power, if possible, will be taken from ship's power and added to it. To push power the other way make the power negative, to do nothing but look simply push (r/s). If either shield or ship's power fails 'NO PWER' is displayed.

(F) Phasor control. Displays 'LOCKED ON', "FIRE". The power inputted isfired at the enemy only if it is in the same quadrant as the ship. Power also drops off very sharply with distance. The actual hit is displayed and if he died or not.

(G) Torpedo control. Displays 'DIR ?'. Give it a Direction as off a clock. The divisions are based on 10 not 60 though eg. 3 fires right, 12=0 fires up, 1.5 fires up right diagonal. If it misses it says so, also gives a track to follow to see by how much you missed. If he has full power you can only disable him first time.

(I) Same as (J) except only sector to sector but able to cross quadrants.

(J) asks for distance to jump, then direction (same as (G)). Then moves ship there and gives new position, and any other important noticements.

Description of Enemy

To do any good with this program you must know your enemy, whether you call him a Klingon, Darth Vader, or just plain enemy. Knowing how he operates is essential.

Phasors usually are only effective at close range or when it is obvious that your oponent is low on power. Usually it is better to torpedo hi. If he still has a good store of power a torpedo will not destroy him but only disable him. The force of the torpedo's impact and the following explosion may throw him around but where he stops he stays. This does not mean, however, that he is now helpless. He is still capable of lobbing the odd missile at you and his phasors never fail. Once he has been destroyed a new enemy comes into the known universe until you get them all.

The foe that you are fighting is a craft devil, and a coward. He attacks you and runs to tire you out and use up your precious time and power. Every so often he stays to fight if he thinks you are weakening, it is then you have to hit him and hit him hard. He usually uses phasors but if he feels you have a chance he turns to the odd missile, but is not a good shot. At close range he is a dead shot.

After he has attacked you your status on your space shield is given. If 'SHIELD LOW' is given power it up straight away. A scan is given next to alert you to his position. He is devious and may attack again if he can.

Description of Base

The base is your salvation. It is a store of supplies to be obtained when needed. The base, to protect it from attack, is surrounded by shields of great magnitude. Because of this it cannot be detected unless right next to it or in the same quadrant. It then shows up in the scans. To occupy the same space is to dock. Power is given as well as new torpedoes. However, once docking occurs the enemy knows where it is so after docking, the base is moved to keep it safe and hidden. If in real need and the base cannot be found then you have no choice but to signal the base you are in trouble. This is done by pressing (H). The base then tries to use its huge resources to transfer you accross the gulfs of space. Unfortunately the ship you are in is a very large object to drag through a hyper jump from the wrong end. Therefore it is obvious that occasionally you do not make it. The base has THREE goes to re-materialise you at its end before your molecules fly all over space never to be of any consequence ever again. If you do make it you go through normal docking procedures.

PROGRAM CARE

This program generally takes care of itself. Once its cards are read it starts up by itself. It will prompt for a size if, and only if, it finds the size not to its liking. Then simply execute the size command for a size of 25 as it says and push R/S once a size of 25 has been performed. The program takes care of all the flags it operates with so all you are left to do is use your finger to run it straight off if programme already exists in memory. The program also asks for a seed number if it feels you need a better one than what it found in storage.

This program can be left at any point (turned off) and returned to without any upset as long as the stack is not upset inbetween times. If stopped at a prompt there is no worry as then the stack has no importance as it has been left free for you to do calculation in enemy direction, distance, etc. The USER mode also switches itself on and off to enable quick calculation response and the use of the upper keys.

The various messages displayed are self explanatory and are to be used by you to work out what is happening. They are not designed to confuse you so here is a list of them:

'BANG'	The ship and enemy collided
'RATING ='	A sign of how well you played
'NO POWER'	Either power of ship or shield failed
'SIZE 25?'	Set size 25
'SEED?'	Wants a number between 0 and 1
'WARS'	Game name announcer
'TRY A-J?'	Either prompt or you gave it a bad input
'x LEFT'	x = number of enemies left
'TORP.S x'	x = number of torpedoes left + 'EMPTY'
'QD: x,y'	Quadrant position
'Sec. x,y'	Sector position in a quadrant
'SHIELD x'	x = power in shield
'POWER = x'	x = ship's power
'TIME = x'	x = time left
'HYPER JUMP'	Base is pulling base through hyper space
'FAILURE X'	x = number of fails to rematerialise
'NO TARGET'	No target for phasor to lock on
'LOCKED ON'	Phasor has locked on a target
'x FIRE'	x = power available, fires phasor
'HIT HIM x'	x = power that struck enemy
'DIR?'	Wants a direction to act on 0 to 12
'DISABLED HIM'	Torpedo hit but did not kill him
'TORPEDO LOST'	Torpedo did not hit a target
'IMPULSE?'	Wants number of sectors to move
'WARP?'	Wants quadrant distance to jump
'BLACK HOLE'	In a black hole
'BASE CLOSE'	Base is in adjacent quadrant
'BASE SECT. X,Y'	Base in same quadrant
'SCAN CLEAR'	All clear
'CONTACT x,y'	Enemy at that quadrant
'AT SECT. x,y'	Enemy at this quadrant sector x,y
'GOT HIM'	Killed enemy
'ALL DEAD'	All enemies killed
'LOST:U'	Above universe
D'	Below universe
R'	Right to universe
L'	Left to universe
'GATE'	Time gate far, near, or close
'GATE FADES'	The time gate dies
'DOCKING'	At the base

PROGRAM CARE CONTINUATION

'BASE MOVED'	Base moves to avoid detection
'ATTACKED'	Enemy is attacking you
'MISSILE SHOT'	Enemy has fired a missile at you
'MISSED'	Enemy's missile missed you
'A HIT'	Enemy's missile hit you
'HIT OF x'	x = magnitude of the phasor hit you got
'SHIELD x'	x = 'OK' shield has plenty of power x = 'LOW' shield is low on power
'DAMAGED'	THIS CONTROL IS OUT OF ACTION
'SPACE STORM'	Space storm is raging
'x FIXED'	x = control fixed
'YOU WON'	You have beaten all of your opponents
'NO TIME'	You have run out of time
'DESTROYED'	Your ship has been destroyed

Various tones act with most of these messages to enhance them or display their importance. If tones are not wanted then clear flag 26.

It should be noted that the more of your enemies you kill the greater the chance of you surviving.

If your scan is not working phasors are still capable of locking on to a target. Bases are always immune to your phasors and torpedoes. All weapons only act on anything that is within the same quadrant.

When the program ends it always sets flag 29 and leaves the formate on FIX 4. If you prefer other settings then alter this (last program lines) and re-record on your cards with flag 11 set.

I hope someone gets something out of this program either as a game or as to new programming techniques.

012200

PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

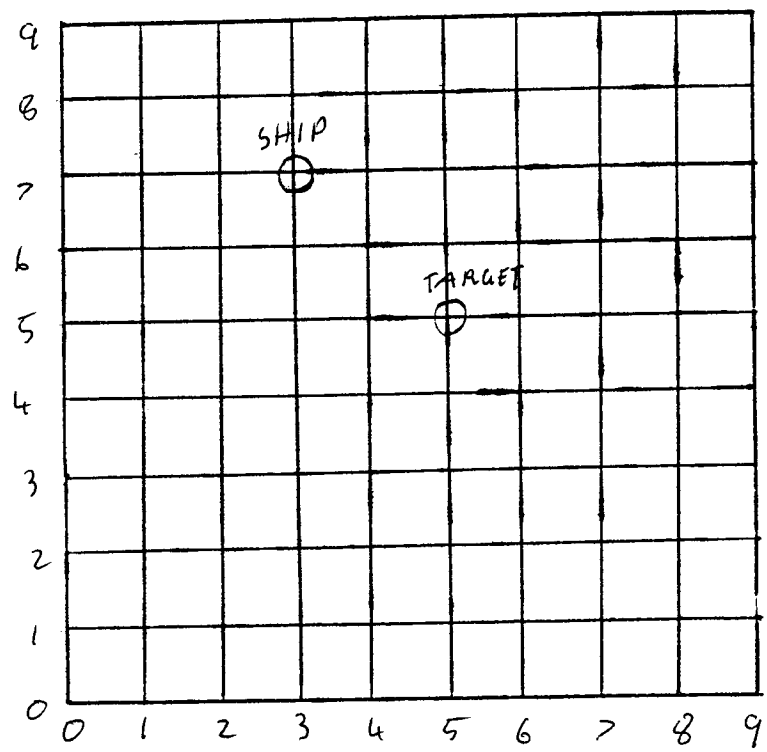
Play 'WARS' (kill first enemy only).

NB. WHEN LOADED FROM CARD READER IT RUNS STRAIGHT AWAY.

SIZE IN THIS EXAMPLE HAS ALREADY BEEN SET TO 25 AND REG. 00 IS CLEAR.

SOLUTION:

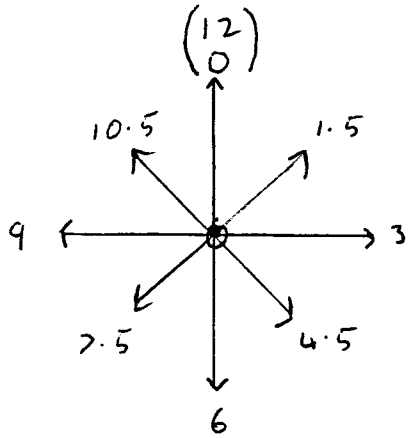
Input	Function	Display	Comments
	[XEQ] WARS	SEED?	PROMPTS FOR A RANDOM
0.1	[R/S]	WARS	NUMBER [0 - 1 best].
		QD: 2,4 Sec. 2,4	POSITION
	[B]	POWER=3000	POWER IS 3000 UNITS
		TIME = 50	AND 50 STARDATES TO GO.
	[C]	SCAN CLEAR	ALL CLEAR RADIUS 3 QUAD.
	[D]	10 LEFT	10 ENEMY'S TO KILL
		TORPS 9	9 TORPEDOES LEFT TO FIRE
	[E]	SHIELD 500?	ADJUSTED SHIELD
1000	[R/S]	SHIELD 1500?	POWER.
	[J]	WARP?	QUADRANTS TO MOVE
5	[R/S]	DIR?	DIRECTION TO MOVE (3 o'clock)
3	[R/S]	QD 7,4 Sec. 2,4	POSITION
		CONTACT 7,6	TARGET AT QUAD. 7,6
	[J]	WARP?	
2	[R/S]	DIR?	
12	[R/S]	QD 7,6 Sec. 2,4	12 o'clock. SAME AS 0.
		SPACE STORM	DANGEROUS.
		ATTACKED	TARGET ATTACKING YOU.
		HIT OF 114	HE HIT WITH PHASORS
		SHIELD OK	SHIP OK
		AT SECT. 3,2	TARGET'D POSITION
	[G]	DAMAGED	TORPEDO IS DAMAGED
	[F]	[1930] FIRE?	USE PHASOR
900	[R/S]	HIT HIM 402	HIT HIM.
		GOT HIM	KILLED HIM
		QD 7,6 Sec. 2,4	START AGAIN.
	A VERY	EASY KILL.	



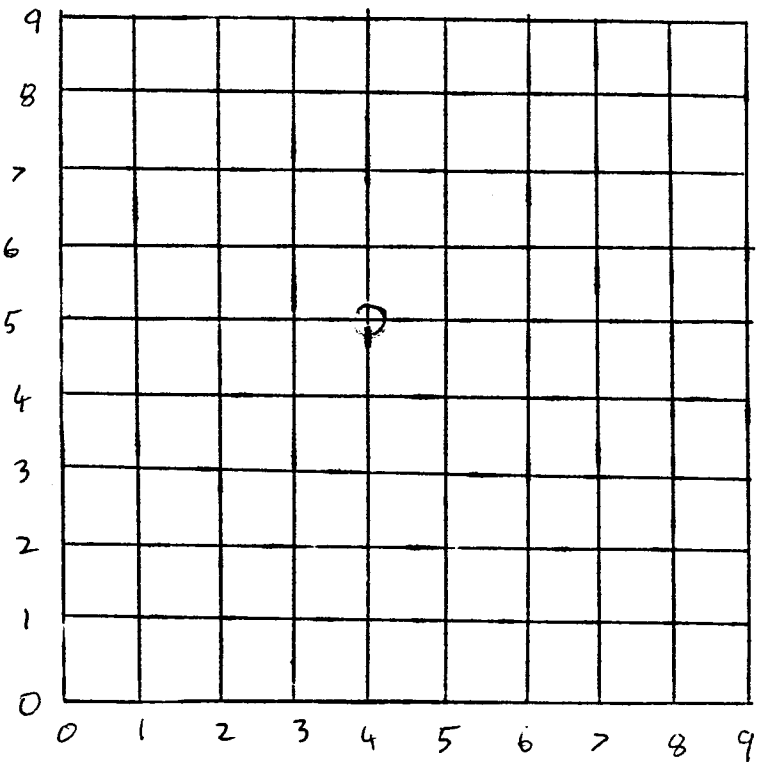
USE TO TRACK TARGET

Quadrant map

Direction



In example direction is 4·5, distance is as below



ATTACK AND DOCKING.

Sector map of each Quadrant

For distance use

$a^2 + b^2 = c^2$

$\therefore c = \sqrt{a^2 + b^2}$

$\therefore$ c = distance calculation

$a = \Delta x$

$b = \Delta y$

$\therefore c = \sqrt{2^2 + 2^2}$

$= \sqrt{\ }$ — work out on keyboard

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USER INSTRUCTIONS

SIZE: 025 (HP-41C)

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	ENTER PROGRAM AND SET SIZE 25			
2	ENTER SEED IF ASKED FOR.	$0 \leq x \leq 1$	[R/S]	'SEED?'
3.	WHEN READY USE :		[A]	POSITION
	:		[B]	'POWER = x'
				'TIME = x'
	:		[C]	SCAN RESULT
	:		[D]	'x LEFT'
				'TORP.S x'
	:		[E]	'SHIELD x'
		Δ POWER	[R/S]	'SHIELD x'
	:		[F]	'NO TARGET'
	OR		[F]	'LOCKED ON'
				'(x) FIRE?'
		Power		'HIT OF x'
	:		[G]	'DIR?'
		$0 \leq x \leq 12$	[R/S]	HIT OR MISS
	:		[H]	'HYPER JUMP'
				'FAILURE x'
				RESULT
	:		[I]	'IMPULSE?'
		Sectors to move.	[R/S]	POSITION
	:		[J]	'WARP?'
		QUADRANTS TO MOVE	[R/S]	POSITION
4.	USING FEEDBACK FROM (3) MAKE A DECISION AND USE (3) AGAIN.			

WHERE 'x' IS A NUMERICAL VARIBLE.

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PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	*LBL "WARS		
	CF 01		Clear vital flags.
	CF 02		
	CF 05		
	CF 06		
	CF 07		
	CF 08		
	SF 25		Check that size is on 25.
	"SIZE 25?		
10	ACL 24		
	FC? 25		
	PROMPT		Ask for seed if one is not already present.
	RCL 00		
	CLRG		
	FRC		
	"SEED?		
	X=0?		
	PROMPT		
	STO 00		
20	SF 25		Scrolls 'WARS'
	"WARS		
	AVIEW		
	GTO "		Goto "space"
	3 E3		Sets power, time, and torpedo units.
	STO 01		
	9		
	STO 02		
	50		
	STO 03		
30	*LBL 02		
	SF 00		Creates a gate through time.
	XEQ "R		
	STO 23		
	X<0?		
	SF 01		
	9.9		
	X<>Y		
	X>Y?		
	SF 01		
40	FC?C 01		
	SF 01		"Time gate"
	XEQ "R		
	STO 24		
	CF 00		
	CF 01		
	FS?C 02		
	RTN		
	10		Enemy number initial + Shield power.
	STO 16		
50	500		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
51	STO 22		
	9.014		loop control
	STO 05		
	*LBL 00		loop creates ship, enemy and base.
	XEQ "R		
	100		
	*		
	INT		
	10		
60	/		
	STO IND 05		
	ISG 05		
	GTO 00		
	2		Tests for similar positions
	ST- 05		
	XEQ "T		
	X=0?		
	GTO 00		
	XEQ "R		
70	1 E3		Creates enemy's Power.
	*		
	100		
	+		
	STO 15		
	FIX 0		Sets display.
	CF 29		
	GTO A		
	*LBL 01		Error tones and message.
	TONE 3		
80	TONE 0		
	"TRY A-Z?		
	*LBL "S		Last message display.
	AVIEW		
	SF 27		
	RTN		
	*LBL D		number of enemy's left display.
	CLA		
	ARCL 16		
	"+ LEFT		
90	AVIEW		
	PSE		
	*LBL 13		Torpedo number display.
	RCL 02		
	"TORP.S		
	X=0?		
	"+ EMPTY		
	X?0?		
	ARCL 02		
	GTO "S		
100	*LBL A		

Note: Refer to "HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 "OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for exact keystrokes.

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
101	FS? 09		
	GTO "U		
	"QD:		
	RCL 09		
	INT		
	ARCL X		
	"H;		
	RCL 10		Displays ship's Position.
	INT		
110	ARCL X		
	"H Sec.		
	RCL 09		
	FRC		
	10		
	*		
	ARCL X		
	H;		
	RCL 10		
	FRC		
120	10		
	*		
	ARCL X		
	GTO "S		
	*LBL E		
	0		Displays current Shield power.
	"SHIELD		
	ASTO 05		
	ARCL 22		
	"H?		
130	CF 27		
	PROMPT		
	X=0?		
	GTO 21		
	X<0?		
	GTO 10		
	RCL 01		
	X<>Y		
	X<Y?		
	ST- 01		
140	X<Y?		
	STO 22		Power change is ~~no~~ positive.
	X<Y?		
	GTO 21		
	X<>Y		
	1		
	-		
	STO 22		
	ST- 01		
	GTO 21		
150	*LBL 10		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
151	ABS		
	RCL 22		Power change is negative
	X?Y?		
	X<>Y		
	ST+ 01		
	ST-22		
	*LBL 21		New power Display
	CLA		
	ARCL 05		
160	"H		
	ARCL 22		
	GTO "S		
	*LBL B		Ship's power display
	"POWER=		
	RCL 01		
	RND		
	ARCL X		
	AVIEW		
	PSE		
170	*LBL "W		Time left display.
	"TIME=		
	ARCL 03		
	GTO "S		
	*LBL H		loop control
	1.003		
	STO 06		
	"HYPER JUMP		message.
	AVIEW		
	PSE		
180	*LBL 03		
	0.3		
	XEQ "R		Hyper jump test control loop.
	X<Y?		
	GTO 06		
	"FAILURE		
	ARCL 06		
	AVIEW		
	TONE 0		
	RCL 06		
190	INT		
	1		
	X≠Y?		
	PSE		
	ISG 06		
	GTO 03		
	GTO 16		
	*LBL 06		Hyper jump succeeded.
	RCL 11		
	STO 09		
200	RCL 12		

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
201	STO 10		
	GTO "Q		
	*LBL F		Phasor damaged test?
	RCL 20		
	X≠0?		
	GTO 23		
	XEQ "?		Target here test?
	"NO TARGET		
	X≠Y?		
210	GTO "S		
	XEQ "T		Target distance find.
	10		
	*		
	STO 06		
	1		Enough power left to operate Phasor?
	RCL 01		
	RND		
	X≤Y?		
	GTO 01		
220	"LOCKED ON		Power display and prompt.
	AVIEW		
	"L		
	ARCL X		
	"? FIRE ?		
	CF 27		
	PROMPT		
	X=0?		Power test
	GTO 01		
	RCL 01		
230	X≤Y?		
	GTO 01		
	X≤Y		
	ST- 01		Hit display.
	RCL 06		
	/		
	RND		
	"HIT HIM		
	ARCL X		
	AVIEW		
240	PSE		
	ST- 15		Target still operational test
	RCL 15		
	X=0?		
	GTO 18		
	GTO "K		
	*LBL G		Torpedo damage test.
	RCL 19		
	X≠0?		
	GTO 23		
250	RCL 02		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
251	X≠0?		Torpedoes left?
	GTO 13		
	"DIR?		Prompt and test.
	CF 27		
	PROMPT		
	X≠0?		
	GTO 01		
	12		
	X≤Y		
260	X>Y?		
	GTO 01		
	30		
	*		Direction store.
	STO 06		
	1		
	ST- 02		
	XEQ "?		Target to hit?
	X≠Y?		
	SF 05		
270	X≠Y?		
	GTO 22		
	RCL 09		
	FRC		
	10		Position store.
	*		
	STO 07		
	RCL 10		
	FRC		
	10		
280	*		
	STO 06		
	RCL 14		
	FRC		Target location store.
	RCL 13		
	FRC		
	10		
	*		
	+		
	STO 05		
290	*LBL "X		
	RCL 06		
	COS		Torpedo flight calculations, and tests.
	RCL 08		
	+		
	STO 08		
	X≤0?		
	GTO 22		
	9		
	X≤Y?		
300	GTO 22		

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
301	RCL 06		
	SIN		
	RCL 07		
	+		
	STO 07		
	X<0?		
	GTO 22		
	9		
	X≠Y?		
310	GTO 22		
	RCL 07		Torpedo flight display
	RND		
	ARCL X		
	"H:"		
	RCL 08		
	RND		
	ARCL X		
	10		
320	/		
	AVIEW		
	+		
	RCL 05		
	X≤Y?		
	GTO "X"		Hit deude.
	FS? 07		
	GTO 18		
	RCL 15		
	100		
330	X>Y?		
	GTO 18		
	SF 06		
	"DISABLED HIM"		Disable deude.
	AVIEW		
	BEEP		
	PSE		
	GTO "K"		
	*LBL 22		
	TONE 4		
340	"TORPEDO LOST"		Lost deude.
	FS?C 05		
	GTO "S"		
	AVIEW		
	PSE		
	GTO "K"		
	*LBL I		
	RCL 18		Impulse damaged?
	X<0?		
	GTO 23		
350	"IMPULSE?"		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
351	CF 27		
	PROMPT		Impulse Prompt and test.
	X<0?		
	GTO 01		
	STO 05		
	5		
	*		
	ST- 01		Power use.
	10		
360	ST/ 05		
	GTO 05		
	*LBL J		Warp damaged?
	RCL 17		
	X<0?		
	GTO 23		
	"WARP?"		
	CF 27		Warp Prompt and test.
	PROMPT		
	1		
370	X<Y?		
	X≤Y?		
	GTO 01		
	STO 05		
	10		Power use and test.
	*		
	ST-01		
	*LBL 05		
	RCL 01		
	X<0?		
380	GTO 14		
	"DIA?"		
	PROMPT		Direction Prompt and test.
	X<0?		
	GTO 01		
	12		
	X<Y?		
	X>Y?		
	GTO 01		
	30		
390	*		Direction store
	STO 06		
	RCL 03		
	X<0?		Time count and test
	GTO 12		
	1		
	ST- 03		
	0.05		Black hole deude.
	XEQ "R"		
400	FC?C 08		
	X>Y?		

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PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
401	GTO 06		
	TBLACK HOLE		
	AVIEW		
	BEEP		
	XEQ TA		
	100		
	*		Black hole sequence.
	INT		
	10		
410	/		
	STO 09		
	500		
	ST- 22		
	RCL 22		
	XLO?		
	GTO 14		
	XEQ TR		
	100		
	*		
420	INT		
	10		
	/		
	GTO 02		
	*LBL 06		
	RCL 06		
	SIN		
	RCL 05		
	*		move ship sequence. Test if lost also.
	RCL 09		
430	+		
	10		
	*		
	AND		
	10		
	/		
	XLO?		
	SF 08		
	9.9		
	XLTY		
440	XTY?		
	SF 08		
	STO 09		
	RCL 06		
	COS		
	RCL 05		
	*		
	RCL 10		
	+		
	10		
450	*		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
451	RND		
	10		
	/		
	XLO?		
	SF 08		
	9.9		
	XLTY		
	XTY?		
	SF 08		
460	*LBL 02		
	STO 10		Position display loop control.
	XEQ A		
	17.021		
	STO 05		
	*LBL TL		
	1		
	ST+ IND 05		
	RCL IND 05		Repair 1 unit each loop.
	2		
470	XLY?		
	STO IND 05		
	154 05		
	GTO TL		
	0.1		Space storm decide.
	XEQ TA		
	XLY?		
	XEQ T-		
	RCL 22		Shield still up test.
	XLO?		
480	GTO 14		
	TWARP		
	RCL 17		Control Fixed Test
	X=0?		
	XEQ T=		
	TIMPULSE		
	RCL 16		
	X=0?		
	XEQ T=		
	TSCAN		
490	RCL 21		
	X=0?		
	XEQ T=		
	RCL 20		
	TPHASOR		
	X=0?		
	XEQ T=		
	RCL 19		
	TTORP.		
	X=0?		
500	XEQ T=		

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PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
501	FS? 08		LOST TEST
	GTO "W		
	XEQ "T		
	X=0?		COLLISION TEST
	GTO 19		
	RCL 09		
	RCL 11		BASE TEST
	X≠Y?		
	GTO 07		
510	RCL 10		
	RCL 12		
	X=Y?		
	XEQ "Q		DOCK
	*LBL 07		
	XEQ "?		ATTACK DECIDE
	X=Y?		
	GTO "K		
	*LBL C		SCAN
	RCL 21		
520	XLO?		DAMAGED?
	GTO 23		
	FS? 08		LOST TEST
	GTO "U		
	RCL 09		
	INT		
	RCL 11		
	INT		
	−		DISTANCE TO BASE
	X↑2		
530	RCL 10		
	INT		
	RCL 12		
	INT		
	−		
	X↑2		
	+		
	SQRT		
	INT		
	1		
540	"BASE CLOSE		CLOSE DECIDE
	X=Y?		
	GTO 06		
	XLY		
	X≠0?		BASE HERE TEST.
	GTO 04		
	"BASE SECT.		
	RCL 11		
	FRC		
	10		
550	*		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
551	ARCL X		
	RCL 12		
	FRC		
	10		
	*		
	"H;		
	ARCL X		
	TONE ?		
	*LBL 06		
560	AVIEW		BASE TONES.
	TONE 9		
	TONE 4		
	PSE		
	*LBL 04		
	XEQ "T		
	3		SCAN TEST
	XLTY		
	"SCAN CLEAR		
	X≠Y?		
570	GTO "S		
	XEQ "?		
	X=Y?		
	GTO 24		
	"CONTACT		TARGET SEEN
	RCL 13		
	INT		
	ARCL X		
	"H;		
580	RCL 14		
	INT		
	ARCL X		
	GTO "S		
	*LBL 24		
	"AT SECT.		
	RCL 13		TARGET HERE.
	FRC		
	10		
	*		
	ARCL X		
590	"H;		
	RCL 14		
	FRC		
	10		
	*		
	ARCL X		
	0.05		
	RCL 00		
	X>Y?		
	GTO "S		
600	AVIEW		ATTACKED.

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PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
6 01	GTO T K		
	*LBL 18		
	T GOT HIM		KILLED
	AVIEW		TARGET
	BEEP		
	1		
	ST- 16		
	CF 07		
	CF 06		
6 10	T ALL DEAD		
	13.014		
	STO 05		
	RCL 16		
	X>0?		
	GTO 00		
	AVIEW		
	BEEP		ALL KILLED
	BEEP		
	GTO 07		
6 20	*LBL T U		
	T LOST:		
	RCL 10		
	XLO?		
	T+D		LOST
	10		DISPLAY
	XL=Y?		
	T+U		
	RCL 09		
	XL 0?		
6 30	T+L		
	10		
	XL=Y?		
	T+R		
	RCL 03		
	X>Y?		
	GTO T S		
	AVIEW		
	RCL 23		
	RCL 09		
6 40	-		
	X↑2		
	RCL 24		GATE
	RCL 10		
	-		HINTS
	X↑2		
	+		
	SQRT		
	INT		
	T GATE		
6 50	2		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
6 51	XL>Y		
	X>Y?		
	T+FAR		
	X>Y?		
	ARCL X		
	X=Y?		
	T+NEAR		
	1		
	XL>Y		
6 60	X=Y?		
	T+CLOSE		
	X≠0?		
	GTO T S		
	T AT GATE		
	AVIEW		
	BEEP		
	50		
	STO 03		AT
	ST+ 04		
6 70	SF 02		GATE
	XEQ 02		
	T GATE FADES		
	AVIEW		
	PSE		
	GTO T U		
	*LBL T Q		
	21.017		BASE FIX
	0		
	*LBL 15		DAMAGE
6 80	STO IND Y		LOOP
	DSE Y		
	GTO 15		
	T DOCKING		
	AVIEW		
	BEEP		
	1 E3		POWER,
	ST+ 22		
	2 E 3		SUPPLYS
	ST+ 01		
6 90	5		ADDED
	ST+ 02		
	CF 07		
	XEQ T R		
	100		
	*		NEW
	INT		
	10		POSITION
	/		
	STO 11		FOR
7 00	XEQ T R		BASE

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PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
701	100		
	*		
	INT		
	10		
	/		
	STO 12		
	50		
	ST+ 04		
	TBASE MOVED		
710	GTO TS		
	*LBL TK		
	0.1		SPACE
	XEQ TA		STORM?
	X≤Y?		
	XEQ T-		
	TATTACKED		
	AVIEW		
	TONE 6		TARGET
	XEQ TA		ATTACK
720	RCL 15		POWER
	2		DECIDE
	/		
	*		
	250		
	X<Y		PHASOR
	X≠Y?		OR
	GTO 04		
	ST- 15		MISSILE
	RND		DECIDE
730	5		
	X<Y		
	X≠Y?		
	GTO 09		
	*LBL 04		
	TMISSILE SHOT		MISSILE
	AVIEW		HIT
	TONE 3		
	PSE		OR
	XEQ T		
740	10		MISS
	*		
	3		
	XLY?		DECIDE
	XEQ TA		
	TMISSED		
	0.5		
	X≠Y?		
	GTO 11		
	500		
750	TA HIT		HIT

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
751	TONE 0		
	GTO 09		
	*LBL 11		
	0		MISSED
	GTO 06		
	*LBL 09		
	THIT OF		PHASOR
	ARCL X		
	*LBL 06		HIT
760	TONE 9		
	*LBL 08		DISPLAY
	AVIEW		
	ST- 22		
	RCL 22		SHIELD
	X=0?		CHECK
	GTO 14		
	FS? 07		
	GTO 20		DISABLED?
	XEQ TA		
770	STO 05		
	XEQ TA		
	360		
	*		TARGET
	STO 06		
	COS		MOVES
	RCL 05		
	*		
	RCL 13		
	+		
780	10		
	*		
	RND		
	10		
	/		
	X≤0?		
	0		
	9.9		
	X≠Y?		
	XLY		
790	STO 13		
	RCL 06		
	SIN		
	RCL 05		
	*		
	RCL 14		
	+		
	10		
	*		
	RND		
800	10		

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PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	/		
	XLO?		
	0		
	9.9		
	X?Y?		
	XL?Y		
	STO 14		
	*LBL 20		SHIELD DISPLAY
	RCL 22		
10	500		
	"SHIELD		
	X?Y?		
	"FLOW		
	XL=Y?		
	"FOK		
	FS?C 06		HIT?
	SF 07		
	XEQ"T		COLLISION TEST
	AVIEW		
20	X=0?		
	GTO 19		
	GTO C		
	*LBL 23		KEY DAMAGED
	"DAMAGED		
	TONE 8		
	GTO"S		
	*LBL"-		
	PSE		
	"SPACE STORM		
30	AVIEW		SPACE STORM
	XEQ"A		
	5		
	*		
	INT		
	17		
	+		
	STO 09		
	XEQ"A		
	9		
40	*		
	INT		
	ST- IND 05		
	RCL IND 05		DAMAGED
	-8		
	X?Y?		
	STO IND 05		
	XEQ"R		
	500		
	*		
50	ST- 22		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
51	RTN		
	*LBL"?		
	RCL 09		IN SAME QUADRANT?
	INT		
	10		
	*		
	RCL 10		
	INT		
	+		
60	RCL 13		
	INT		
	10		
	*		
	RCL 14		
	INT		
	+		
	RTN		
	*LBL"=		FIXED DISPLAY
	"FIXED		
70	AVIEW		
	TONE 7		
	PSE		
	RTN		
	*LBL"T		DISTANCE TO TARGET
	RCL 09		
	RCL 13		
	-		
	X↑2		
	RCL 10		
80	RCL 14		
	-		
	X↑2		
	+		
	SQRT		
	RTN		
	*LBL"R		RANDOM GENERATOR
	RCL 00		
	9821		
	*		
90	0.211327		
	+		
	FRC		
	STO 00		
	FC? 00		
	RTN		
	31		
	*		
	INT		
	10		
00	-		

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PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
001	FC? 01		
	ATN		
	XLO?		GATE
	ATN		
	10		GENERATOR
	XL=Y?		
	ATN		
	GTO "A"		
	*LBL 19		
010	"BANG		
	AVIEW		COLLISION
	PSE		
	GTO 16		
	*LBL 07		
	"YOU WON		YOU
	AVIEW		
	PSE		WIN
	GTO 17		
	*LBL 12		
020	"NO TIME		TIME
	AVIEW		
	PSE		UP
	GTO 16		
	*LBL 14		
	"NO POWER		POWER
	AVIEW		
	TONE 0		GONE
	PSE		
	*LBL 16		
030	TONE 0		
	"DESTROYED		SHIP IS
	AVIEW		WRECKED
	TONE 0		
	*LBL 17		
	TONE 8		
	TONE 6		
	"RATING=		RATING.
	RCL 04		
	10		
040	ACL 16		
	−		
	10		
	*		
	+		
	RND		
	ARCL X		
	AVIEW		
	CLA		RESETS
	FIX 4		
050	CF 03		

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
051	CF 27		TO
	SF 29		
	CLST		PERSONAL
	END		STATUS.
060			
070			
080			
090			
00			

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REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS

00	SEED
01	SHIP'S POWER
02	TORPEDO STORE
03	TIME COUNT DOWN
04	KILL BONUS
05	MAGNITUDE/COUNTER
06	DIRECTION/COUNTER
07	TORP. X
08	TORP. Y
09	x, x OF SHIP
10	y, y OF SHIP
11	x, x OF BASE
12	y, y OF BASE
13	x, x OF TARGET
14	y, y OF TARGET
15	POWER OF TARGET
16	NUMBER OF TARGETS
17	DAMAGE 3
18	" I
19	" G
20	" F
21	" C
22	SHIELD POWER
23	GATE X
24	" y

STATUS

SIZE	25	TOT. REG.	313	USER MODE	
ENG		FIX	0	SCI	
DEG	X	RAD		GRAD	

ON ✓ OFF ✓ Both

FLAGS

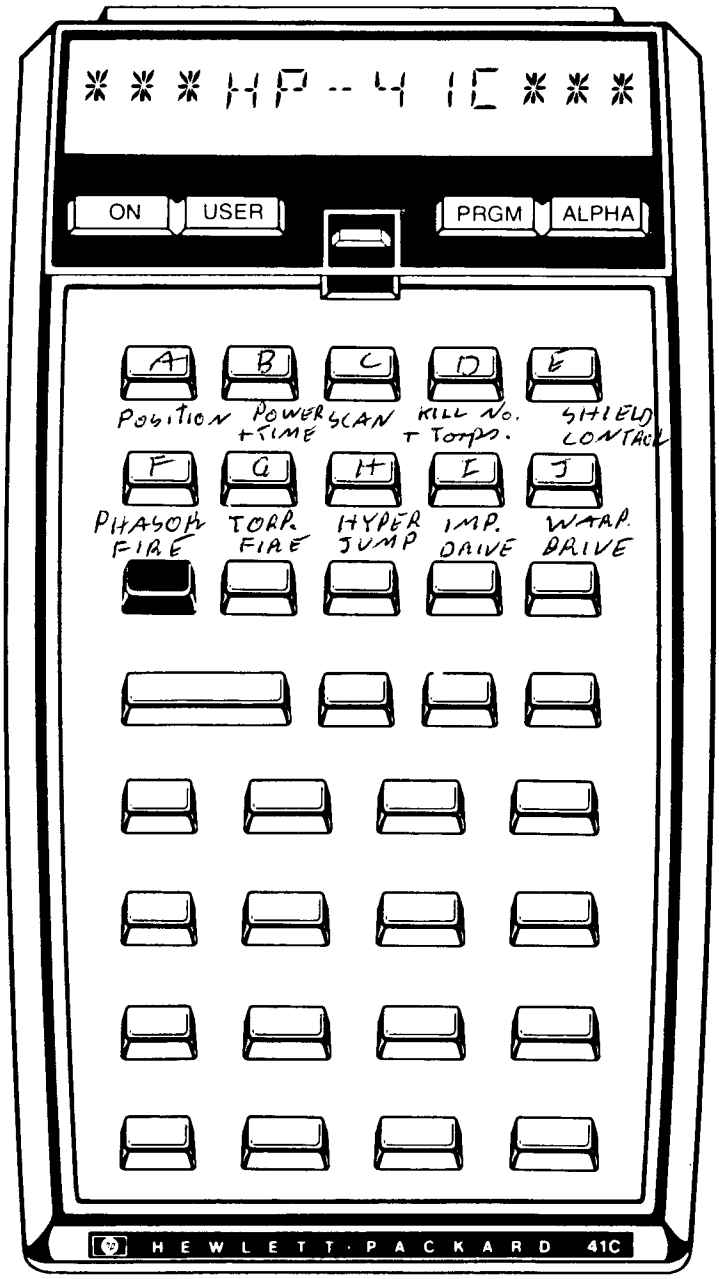
#	INIT S/C	SET INDICATES	CLEAR INDICATES
00	C	USED	
01	C	USED	
02	C	USED	
05	C	MISSED (Torp).	A. ENEMY
06	C	TORP. HIT	
07	C	ENEMY DISABLED	ENEMY MOVES
08	C	LOST	IN UNIVERSE
27		USER MODE	
29		NOT USED.	NO DOT.

ASSIGNMENTS

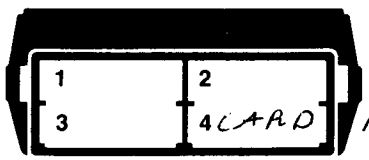
	FUNCTION	KEY	FUNCTION	KEY
A	√x	Σ+		
B		1/x	Usual	
C		√x	local	
D		LOG	table (alpha)	
E		LN	setup.	
F		x⟷y		
G		R↓		
H		SIN		
I		COS		
J		TAN		

KEYBOARD CARD LABELING

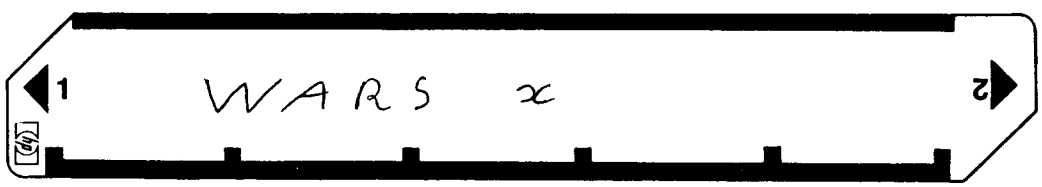
KEYBOARD



SYSTEM CONFIGURATION



CARD



where x is a number 1 - 9

PROGRAM REGISTERS NEEDED: 288

ROW 1 (1 : 4)

ROW 2 (4 : 9)

ROW 3 (9 : 15)

ROW 4 (16 : 21)

ROW 5 (21 : 27)

ROW 6 (28 : 35)

ROW 7 (35 : 42)

ROW 8 (42 : 48)

ROW 9 (49 : 53)

ROW 10 (54 : 61)

ROW 11 (61 : 68)

ROW 12 (68 : 74)

ROW 13 (75 : 81)

ROW 14 (81 : 82)

ROW 15 (83 : 89)

ROW 16 (89 : 94)

ROW 17 (94 : 98)

ROW 18 (98 : 103)

ROW 19 (103 : 110)

ROW 20 (110 : 114)

ROW 21 (115 : 122)

ROW 22 (123 : 126)

ROW 23 (126 : 133)

ROW 24 (133 : 141)

ROW 25 (142 : 149)

ROW 26 (149 : 157)

ROW 27 (158 : 163)

ROW 28 (164 : 169)

ROW 29 (170 : 172)

ROW 30 (173 : 177)

ROW 31 (177 : 181)

ROW 32 (181 : 185)

ROW 33 (185 : 193)

ROW 34 (194 : 202)

ROW 35 (202 : 207)

ROW 36 (208 : 210)

ROW 37 (210 : 219)

ROW 38 (219 : 222)

ROW 39 (222 : 225)

ROW 40 (225 : 234)

ROW 41 (235 : 238)

ROW 42 (239 : 246)

ROW 43 (246 : 253)

ROW 44 (253 : 260)

ROW 45 (261 : 268)

ROW 46 (269 : 277)

ROW 47 (278 : 288)

ROW 48 (289 : 297)

ROW 49 (297 : 306)

ROW 50 (307 : 314)

ROW 51 (314 : 322)

ROW 52 (323 : 329)

ROW 53 (329 : 333)

ROW 54 (333 : 337)

ROW 55 (338 : 340)

ROW 56 (340 : 345)

ROW 57 (345 : 350)

ROW 58 (350 : 356)

ROW 59 (357 : 363)

ROW 60 (364 : 368)

ROW 61 (369 : 378)

ROW 62 (379 : 385)

ROW 63 (385 : 394)

ROW 64 (395 : 401)

ROW 65 (401 : 403)

ROW 66 (404 : 411)

ROW 67 (412 : 417)

ROW 68 (418 : 426)

ROW 69 (427 : 437)

ROW 70 (437 : 446)

ROW 71 (447 : 456)

ROW 72 (456 : 463)

ROW 73 (463 : 467)

ROW 74 (468 : 474)

ROW 75 (475 : 481)

ROW 76 (481 : 485)

ROW 77 (485 : 489)

ROW 78 (489 : 494)

ROW 79 (494 : 498)

ROW 80 (498 : 502)

ROW 81 (503 : 510)

ROW 82 (511 : 517)

ROW 83 (518 : 523)

ROW 84 (524 : 536)

ROW 85 (537 : 540)

ROW 86 (540 : 546)

ROW 87 (546 : 551)

ROW 88 (551 : 558)

ROW 89 (559 : 567)

ROW 90 (568 : 570)

ROW 91 (570 : 574)

ROW 92 (574 : 579)

ROW 93 (580 : 584)

ROW 94 (584 : 590)

ROW 95 (590 : 597)

ROW 96 (598 : 603)

ROW 97 (603 : 609)

ROW 98 (609 : 611)

ROW 99 (611 : 619)

ROW 100 (619 : 621)

ROW 101 (622 : 629)

ROW 102 (630 : 636)

ROW 103 (636 : 646)

ROW 104 (647 : 653)

ROW 105 (653 : 657)

ROW 106 (657 : 663)

ROW 107 (663 : 667)

ROW 108 (667 : 672)

ROW 109 (672 : 676)

ROW 110 (676 : 679)

ROW 111 (679 : 683)

ROW 112 (683 : 688)

ROW 113 (689 : 694)

ROW 114 (695 : 702)

ROW 115 (703 : 709)

ROW 116 (709 : 711)

ROW 117 (711 : 716)

ROW 118 (716 : 719)

ROW 119 (720 : 728)

ROW 120 (729 : 735)

ROW 121 (735 : 739)

ROW 122 (739 : 745)

ROW 123 (745 : 750)

ROW 124 (750 : 755)

ROW 125 (756 : 760)

ROW 126 (760 : 768)

ROW 127 (768 : 773)

ROW 128 (774 : 784)

ROW 129 (785 : 794)

ROW 130 (795 : 804)

ROW 131 (804 : 811)

ROW 132 (811 : 813)

ROW 133 (814 : 819)

ROW 134 (820 : 824)

ROW 135 (824 : 827)

ROW 136 (827 : 829)

ROW 137 (829 : 838)

ROW 138 (838 : 846)

ROW 139 (846 : 852)

ROW 140 (852 : 861)

ROW 141 (862 : 869)

ROW 142 (869 : 874)

ROW 143 (874 : 883)

ROW 144 (884 : 889)

ROW 145 (890 : 895)

ROW 146 (896 : 905)

ROW 147 (905 : 910)

ROW 148 (911 : 915)

ROW 149 (915 : 920)

ROW 150 (920 : 925)

ROW 151 (925 : 931)

ROW 152 (931 : 934)

ROW 153 (934 : 937)

ROW 154 (938 : 946)

ROW 155 (947 : 954)

ROW 156 (954 : 954)