

Program Description I

Program Title SPACE WAR PLUS

Contributor's Name THOMAS A. GLEESON

Address 2106 OLD BAINBRIDGE ROAD

City TALLAHASSEE State FLORIDA Zip Code 32303

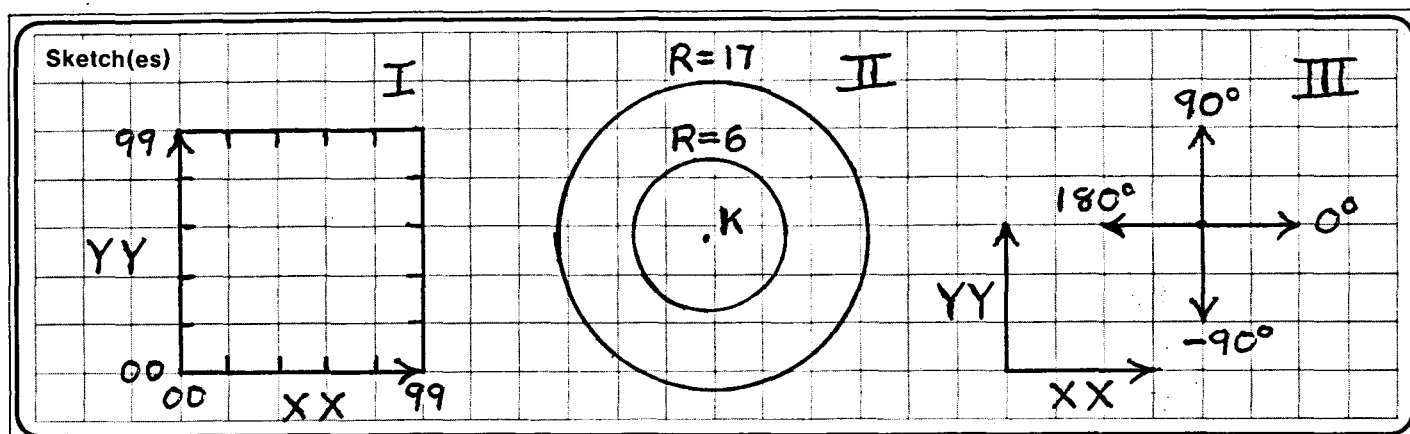
Program Description, Equations, Variables YOU ARE COMMANDER OF THE STARSHIP 'KITTYHAWK', K, WHOSE MISSION IS TO FIND (BY USE OF LONG- AND SHORT-RANGE SENSORS) AND DESTROY 3 TO 7 ALGLOGS, A, IN A GALAXY WHOSE DIMENSIONS ARE 99 BY 99 UNITS OF DISTANCE (SEE SKETCH I). YOUR RESOURCES ARE 3 TORPEDOS, T, AND 1000 UNITS OF ENERGY, E, TO POWER PHASER CANNONS AND A PROTECTIVE FORCE FIELD. ALSO, THERE IS A SUPPLY BASE, B, SOMEWHERE TO REPLENISH THESE RESOURCES TO YOUR DOCKED SHIP. ONE STARDAY, D, IS USED EACH TIME YOUR SHIP IS MOVED AND YOU HAVE 18 STARDAYS TO COMPLETE THE MISSION. SENSORS DETECT THE RANGE, R, OF AN OBJECT WHEN $R < 6$, AND ITS DIRECTION, θ , (TO NEAREST DEGREE) WHEN $R < 17$ (SEE SKETCHS II AND III). THE CLOSER YOU ARE TO A TARGET THE BETTER THE CHANCES A TORPEDO WILL HIT IT AND THE FEWER ENERGY UNITS, E' , ($100 < E' < 280$) REQUIRED BY PHASERS TO DESTROY IT. 100 MORE UNITS MAINTAIN A FORCE SHIELD AGAINST RETURN FIRE EACH TIME PHASERS ARE USED. WEAPONS WILL NOT FIRE IF TARGET IS NOT IN RANGE: $R < 6$.

Operating Limits and Warnings STEPS 2, 3, 7, 9, 11, AND 12 ARE SENSITIVE TO FLAG 3. 'ERROR' APPEARS WHEN TORPEDO, FIRING RANGE, AND TIME LIMITS ARE EXCEEDED.

MISTAKEN ATTEMPTS TO DESTROY THE BASE ARE RISKY, AND TO DOCK WITH ALGLOGS ARE DISASTROUS. TO DOCK OR FIRE WEAPONS, FINAL OUTPUT OF PREVIOUS SCAN (STEP 3 OR 12) SHOULD NOT BE ZERO.

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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Sample Problem(s) WITH AN INITIAL SEED, $S=.123456789$, THE KITTYHAWK IS LOCATED AT $YY=86$, $XX=16$. SENSORS INDICATE 3 ALGLOGS ($N=4,3,2$) ARE PRESENT BUT JUST 1 IS NEARBY ($6 < R < 17$). MOVE TO ATTACK. YOUR FIRST TORPEDO MISSES BUT THE SECOND DESTROYS THE TARGET. MOVE TO $YY=XX=86$ AND FIND ANOTHER ALGLOG ($N=2$) IN FIRING RANGE. PHASERS ELIMINATE IT.

(PARENTHESES INDICATE PAUSES.)

SUMMARY:

YY	XX	N	R	θ
86	16	4	$6 \leftrightarrow 17$	58°
95	27	4	4.84	146°
86	86	2	4.15	-28°

Solution(s) KEYSTROKES:

$.123456789$ fA $\rightarrow 86.16$;	146.4 C $\rightarrow (0)$;
B $\rightarrow 4.$;	R/S $\rightarrow 0.$;
fB $\rightarrow 58.$;	86 ENTER $\uparrow \rightarrow 86.$;
95 ENTER $\uparrow \rightarrow 95.$;	A $\rightarrow 86.86$;
27 A $\rightarrow 95.27$;	B $\rightarrow (3.), 2.$;
B $\rightarrow 4.$;	fB $\rightarrow (4.15), -28.$;
fB $\rightarrow (4.84), 146.$;	225 D $\rightarrow (0)$;
C $\rightarrow (4.84), 146.$;	R/S $\rightarrow 0.$.

Reference(s) 'SPACE WAR', (H.P.'S #179D AND GAMES PAC I). AREAS SCANNED BY SENSORS ARE APPROXIMATELY EQUAL IN BOTH VERSIONS. AREAS ARE SQUARE IN FIRST VERSION, CIRCULAR HERE. PHASER FIRE IS OMNI-DIRECTIONAL IN FIRST VERSION, CONE-SHAPED HERE.



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	LOAD SIDES 1 AND 2.		<input type="checkbox"/> <input type="checkbox"/>	
2	INPUT SEED, S, ($0 \leq S < 1$). OUTPUT IS YOUR POSITION.	S	F A	YY.XX
3	SCAN FOR ALGLOGS ($N=8,7,\dots,2$) AND BASE ($N=1$).		B <input type="checkbox"/>	N N/O
4	IF FINAL OUTPUT OF STEP 3 IS NOT ZERO, CHECK RANGE, R, AND DIRECTION, θ . IF VALUE OF R DOES NOT APPEAR, $6 \leq R < 17$.		f B	R θ
5	TO FIRE TORPEDO, ENTER AIMED DIRECTION, θ' . BLINKING ZERO IS SEEN IF ALGLOG IS DESTROYED.	θ'	C <input type="checkbox"/>	O/R θ
6	TO FIRE PHASERS, ENTER ENERGY, E' . (100 MORE UNITS GO TO SHIELD.)	E'	D <input type="checkbox"/>	O/R θ
7	TO MOVE STARSHIP, ENTER COORDINATES OF DESTINATION.	YY X X	ENTER <input type="checkbox"/>	
8	DOCK FOR SUPPLIES AT BASE, ($N=1$), WHEN $R < 2$. OUTPUT IS DAYS, D, TORPEDOS, T, AND ENERGY, E, THEN AVAILABLE.		A <input type="checkbox"/>	YY.XX
9	START NEW GAME.		f E	D T.E
			<input type="checkbox"/> <input type="checkbox"/>	
	OPTIONS:			
10	CHECK CURRENT STATUS.		E <input type="checkbox"/>	YY.XX
11	CHECK CURRENT POSITION.		A <input type="checkbox"/>	N/O
12	SPECIFY FIRST OBJECT TO BE SCANNED.	N	B <input type="checkbox"/>	
			<input type="checkbox"/> <input type="checkbox"/>	
	NOTES:			
	-A. SCAN (STEPS 3 AND 12) COUNTS DOWN TOWARD ZERO BUT STOPS FOR FIRST OBJECT WITH RANGE $R < 17$.		<input type="checkbox"/> <input type="checkbox"/>	
	-B. NUMBER, N, OF DESTROYED ALGLOG DOES NOT APPEAR THEREAFTER ON SCAN.		<input type="checkbox"/> <input type="checkbox"/>	
	-C. BLINKING ZEROES APPEAR WHEN ALGLOG DEFEATS YOUR SHIP.	E'	D <input type="checkbox"/>	0.00000

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	* LBL C	31 25 13	FIRE TORPEDO, IF POSSIBLE, AND DECIDE ON HIT OR MISS.		RCL 9	34 09	STOP SCAN FOR FIRST OBJECT FOR WHICH R<17.
	CF3	35 61 03			PZS	31 42	
	RCL D	34 14			-	51	
	F?0	35 71 00		060	XZ4	35 52	
	CHS	42			R→P	32 72	
	I	01			STP C	33 13	
	-	51			XZ4	35 52	
	X<0	31 71			STP B	33 12	
	VX	31 54			I	01	
010	STP D	33 14			7	07	
	R↓	35 53	FIRE PHASERS, IF POSSIBLE, AND DECIDE ON SUCCESS OR FAILURE.		RCL C	34 13	STORE TORPEDOS AND ENERGY.
	RCL B	34 12			X>4	32 81	
	-	51			GT05	22 05	
	ABS	35 64		070	RCL	35 34	
	RCL C	34 13			RTN	35 22	
	I/X	35 62		*	LBL 9	31 25 09	
	X>4	32 81			3	03	
	GT06	22 06			STP D	33 14	
	GT06	22 31 12			10X	32 53	
020	* LBL D	31 25 14			STP 0	33 00	
	CF3	35 61 03	SCAN, STARTING WITH HIGHEST OR SPECIFIED- VALUE OF N. FIND R AND θ FOR EACH OBJECT.		RTN	35 22	DEFEATED KITTYHAWK RENDERED POWERLESS
	F?0	35 71 00		*	LBL 8	31 25 08	
	GT0 C	22 13			CLX	44	
	ABS	35 64		080	STP 0	33 00	
	STP-0	33 51 00			PZS	31 42	
	RCL C	34 13			STP 0	33 00	
	X ²	32 54			PZS	31 42	
	5	05			STP D	33 14	
	X	71			SFO	35 51 00	
030	EEX	43			DSP 9	23 09	
	2	02	STORE SEED, START GAME, DECIDE NUMBER OF ALGLOGS, AND CHOOSE COORDINATES FOR ALL OBJECTS.	*	LBL 4	31 25 04	BLINKING ZEROS PART OF, AND EXIT FROM, LOOP I IN B
	STP-0	33 51 00			PAUSE	35 72	
	+	61			GT0 4	22 04	
	-	51		090	* LBL 5	31 25 05	
	RCL 0	34 00			RCL	35 34	
	X<0	31 71			PAUSE	35 72	
	GT0 8	22 08		*	LBL 6	32 25 13	
	R↓	35 53			DSZ	31 33	
	X>0	31 81			GT0 1	22 01	
040	GT0 6	22 06			CLX	44	
	GT0 6	22 31 12	STORE SEED, START GAME, DECIDE NUMBER OF ALGLOGS, AND CHOOSE COORDINATES FOR ALL OBJECTS.		STP B	33 12	
	* LBL B	31 25 12			RTN	35 22	
	RCL E	34 15		*	LBL 7	32 25 11	
	F?3	35 71 03		100	SFO	35 51 00	
	GSB 6	32 22 14			F?3	35 71 03	
	STI	35 33			STP A	33 11	
	SFO	35 51 00			GSB 3	31 22 03	
*	LBL I	31 25 01			RCL A	34 11	
	DSP 0	23 00			5	05	
050	RCL(i)	34 24			X	71	
	X=0	31 51	REGISTER		4	04	
	GT0 6	22 31 13			+	61	
	RCL 9	34 09			INT	31 83	
	-	51		110	STP E	33 15	
	PZS	31 42			GSB 9	31 22 09	
	RCL(i)	34 24			9	09	

REGISTERS

0 E	1 B-XX	2 A2-XX	3 A3-XX	4 A4-XX	5 A5-XX	6 A6-XX	7 A7-XX	8 A8-XX	9 K-XX
S0 D	S1 B-YY	S2 A2-YY	S3 A3-YY	S4 A4-YY	S5 A5-YY	S6 A6-YY	S7 A7-YY	S8 A8-YY	S9 K-YY
A SEED, #	B θ	C R	D T	E M=NO.OBJECTS	I USED				

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
	STI	35 33	ARM KITTYHAWK AND SET TIME LIMIT FOR MISSION.		PZS	31 42	SHIP MOVES AND ONE STARDAY PASSES.
*	LBL 2	31 25 02		170	RCL O	34 00	
	GSB 3	31 22 03			PZS	31 42	
	STO (i)	33 24			1/X	35 62	
	GSB (3)	31 22 03			R↓	35 53	
	PZS	31 42			STO 9	33 09	
	STO (i)	33 24			XZ 4	35 52	
120	PZS	31 42			PZS	31 42	
	DSZ	31 33			STO 9	33 09	
	GT0 2	22 02			1	01	
	1	01	MOVE SHIP AND/OR DISPLAY ITS POSITION.		STO - 0	33 51 00	DECIDE TO DISPLAY Θ OR R AND Θ.
	8	08		180	PZS	31 42	
	PZS	31 42			SFO	35 51 00	
	STO 0	33 00			GT0 A	22 11	
	PZS	31 42		*	LBL 6	32 25 12	
*	LBL A	31 25 11			CF 3	35 61 03	
	FZ 3	35 71 03			DSP 2	23 02	
130	GT0 0	22 00			6	06	
	DSP 2	23 02			RCL C	34 13	
	PZS	31 42			RND	31 24	
	RCL 9	34 09	DOCK.	190	XZ 4	32 71	GENERATE SPACE COORDINATE.
	PZS	31 42			CF 0	35 61 00	
	INT	31 83			XZ 4	32 71	
	RCL 9	34 09			PAUSE	35 72	
	EEX	43			DSP 0	23 00	
	2	02			RCL B	34 12	
	÷	81			RND	31 24	
140	+	61			RTN	35 22	
	RTN	35 22		*	LBL 3	31 25 03	
*	LBL 4	32 25 15	DISPLAY STATUS.		RCL A	34 11	
	RCL C	34 13			9	09	WAS BASE OR ALGLOG ATTACKED?
	2	02		200	9	09	
	XZ 4	32 71			7	07	
	GT0 E	22 15			X	71	
	RCL	35 34			FRAC	32 83	
	1	01			ST0 A	33 11	
	XZ 4	32 61			EEX	43	
150	GT0 8	22 08			2	02	
	GSB 9	31 22 09			X	71	
*	LBL E	31 25 05			RTN	35 22	
	CF 3	35 61 03	CHECK INPUT VALUE OF N.	*	LBL 6	31 25 06	
	PZS	31 42		210	RCL	35 34	
	RCL O	34 00			1	01	
	PZS	31 42			XZ 4	32 51	
	DSP 0	23 00			GT0 8	22 08	
	PAUSE	35 72		CLX →	CLX	44	
	RCL O	34 00			STO (i)	33 24	
160	INT	31 83			SFO	35 51 00	
	EEX	43			DSP 0	23 00	
	4	04			GT0 4	22 04	
	÷	81		*	LBL 6	32 25 14	
	RCL D	34 14		220	XZ 4	35 52	
	+	61			XZ 4	32 81	
	DSP 4	23 04			XZ 4	35 52	
	RTN	35 22			RTN	35 22	
*	LBL O	31 25 00					

LABELS										FLAGS	SET STATUS						
A	MOVE	B	SCAN	C	TORP.	D	PHAS.	E	STATUS	0	R>6	FLAGS		TRIG		DISP	
a	START	b	R, θ	c	DSZ	d	N>M?	e	DOCK	1		ON OFF		DEG <input checked="" type="checkbox"/>		FIX <input checked="" type="checkbox"/>	
0	IN A	1	LOOP	2	LOOP	3	XX,YY	4	BLINK	2		0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>	
5	LOOP	6	N=1?	7		8	LOST	9	SUPPLY	3	USED	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>	
												3	<input type="checkbox"/>	<input checked="" type="checkbox"/>		n <u>0</u>	