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Dear Robert Fabris:

The enclosed tape, inspired by the Commodore 64's "Visible Solar System" cartridge, is an Astro-Basic program that you may wish to publish in the Arcadian.

I hope that I can supply future programs that will deal with other aspects of space and physical laws. I hope others will submit programs too, to make a kind of Arcadian series of educational programs.

Fred Rodney

P.S. The "Gravity" program enclosed was written by me and is, to the best of my recollection, an original program, that does not intentionally use unauthorized material from other sources. The program is submitted for the enjoyment and use of Arcadian readers.

3/12/84

GRAVITY by F. Rodney

You command the first fleet of inter-planetary space probes. You launch probes from aboard your command post on the space shuttle Enterprise. All probes are capable of hovering over any planet at 2000 feet (except Pluto) and each can escape back into space to perform gravitational tests elsewhere. The probes, however, cannot escape from the gravity and heat of the sun. All probes that enter the solar atmosphere for tests will disintegrate, but not before sending you the data you seek. You are left, upon disintegration, with a scene of the night sky from a telescope on your space shuttle. Since you have an unlimited supply of space probes, the disintegration of a few should not concern you. Begin with a probe on Earth, for reference.

INSTRUCTION: Load the program and the *() array. There is one byte of RAM left on both sides of the array (buffer) so be careful. Run the program. First, you should see the night sky followed by the program title, a little music, and the exhaust from the launch of your shuttle craft. Then a map of the solar system will appear as a reference, with the massive sun on your left. Finally, a menu will appear. Choose a planet to probe from this list by entering the proper number on your keypad (Pluto is not listed because its gravity is not known). After you enter your choice, the map will reappear, highlighting your choice (showing its relative position in the solar system). The screen will then shift to a scene of the planet's surface, with your probe positioned at 2000 feet above the surface. The name of the planet will be on top with its relative gravitational constant (Earth=1) and a seconds clock on the left. After signaling, the probe will release a weight and the clock will time the weight's moment of impact based on the formula: $H = \frac{1}{2}gt^2$ or $t = \sqrt{\frac{2H}{g}}$. The menu will reappear and further tests on other planets may be made.

Because of the Astrocade's limited memory, you can only test for gravity with this program. Therefore, this program is called a chapter in a proposed series of educational programs that were inspired by the Commodore 64's "Visible Solar System" cartridge. Future programs will visually compare other features of the solar system and perhaps a venture to another star. Arcadian readers are encouraged to submit "chapters" to this Astrocade Educational "Library." All programs should be factual and fun, and in this context, this program includes a few graphic surprises, using nothing more complicated than an &(9) port setting.

One final note: Don't attempt to set your watch by this program's clock. The final time readings are correct and can easily be checked with a calculator. And this is what really matters. Limited memory precludes the use of the Astrocade's RAM variable. I simply felt that the added "frills" were more important because an educational program must be interesting to be used, especially by children. Leave exact seconds (rate of seconds to be precise) to the Analog Clock by George Moses. In addition to the above, the relative gravity constants have a range of 175 with the sun included, but is only 17 without the sun. Most of the activity takes place within this small range, but with the sun included, a difference must be demonstrated within the range of 17 without having to go overboard to demonstrate the tremendous gravity of the sun.

*The column of pixels in the center of the map represents the asteroid belt.

*Gravity, by Fred Rodney 1984

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1 CLEAR:NT=0;NM=2;NV=25;BC=0;FC=7;FOR S=0TO 120;BOX RND (160)-80,RND
(80)-40,1,1,3;NEXT S;IF A=46A=0;GOTO 20
2 P=-30;CY=30;CX=P;PRINT " GRAVITY";CY=P;PRINT " FRED RODNEY 1984
";CY=0
4 A=47;NT=9;FOR N=0TO 15;MU=*(N);NEXT N;NT=70;MU=90
5 GOSUB 79;FOR N=255TO 25STEP -1;HV=N;BOX -4,3,N+20,N+20,3;NEXT N;G
OSUB 25
20 Z=0;CY=40;PRINT;CX=P;PRINT "1.EARTH";CX=P;PRINT "2.THE MOON
22 CX=P;PRINT "3.MERCURY";CX=P;PRINT "4.VENUS";CX=P;PRINT "5.MARS";CX=
P;PRINT "6.JUPITER";CX=P;PRINT "7.SATURN
23 CX=P;PRINT "8.URANUS";CX=P;PRINT "9.NEPTUNE";CX=P;PRINT "0.THE SUN"
;BC=7;FC=0;A=K;IF (A 48)+(A 57)GOTO 20
25 CLEAR;GOSUB 70;FOR L=1TO 1500;NEXT L;CLEAR;&(9)=50;IF A=47BC=0;FC=7
;GOTO 40
30 FC=8;CX=-38;CY=24;IF A=48G=2;PRINT " THE SUN=28
31 IF A=49G=22;BC=167;PRINT " EARTH=1
32 IF A=50G=57;BC=0;FC=7;PRINT "THE MOON=0.16
33 IF A=51G=43;BC=22;PRINT "MERCURY=0.28
34 IF A=52G=24;BC=71;PRINT "VENUS=0.85
35 IF A=53G=37;BC=51;PRINT "MARS=0.38
36 IF A=54G=13;BC=54;PRINT "JUPITER=2.6
37 IF A=55G=20;BC=44;PRINT "SATURN=1.2
38 IF A=56G=22;BC=19;PRINT "URANUS=1.4
39 IF A=57G=18;BC=4;PRINT "NEPTUNE=1.4
40 BOX -4,1,1,1,1;BOX -4,3,3,1;BOX -8,2,1,1,1;BOX 0,2,1,1,1;IF A=47
GOTO 65
42 FOR L=-15TO 0STEP 15;BOX 31,1,2,1,1;NEXT L;LINE -80,-30,4;LINE 79,-
30,1;LINE 79,-40,4;LINE 0,-30,1;LINE -80,-40,1
43 CY=0;CX=37;PRINT "*2000";PRINT " SEC.";CX=43;PRINT "FEET";GOSUB 5
&NM=2
50 FOR Y=-1TO -29STEP -1;BOX -4,Y,1,1,3;FOR B=0TO G;Z=Z+1;NV=456+G;NEX
T B;CY=0;PRINT #5,Z+60;BOX -4,Y,1,1,3;NEXT Y;GOSUB 68
60 IF A=48NT=6;FOR L=1TO 8;MU=90;MU=65;BOX -4,3,15,8,3;NEXT L;NT=0;N
M=2;FOR L=1TO 31STEP 2;NV=255+L;BOX -4,3,L,L,3;NEXT L;RUN
65 GOSUB 68;GOSUB 79;GOTO 20
68 NT=2;FOR N=1TO 5;MU=90;BOX -4,3,1,1,3;MU=65;NEXT N;NT=0;RETURN
70 &(9)=68;BC=87;&(0)=0;&(1)=0;&(2)=5;&(3)=5;M=0
72 BOX -52,0,3,3,1;BOX -40,0,5,5,1;BOX -27,0,5,5,1;BOX -29,5,1,1,1
74 BOX -17,0,3,3,1;FOR L=-40TO 40STEP 8;BOX RND (4)-8,L,1,1,1;NEXT L
76 BOX 10,0,10,10,1;BOX 28,0,8,8,1;LINE 22,5,4;LINE 34,-6,3
78 BOX 46,0,6,6,1;BOX 63,0,6,6,1;BOX 75,0,1,1,1;CX=30;CY=-33;PRINT "MA
P";GOTO A+32
79 FOR L=1TO 700;NEXT L;RETURN
80 CLEAR;Z=36;FOR L=67TO 105;&(9)=L;NEXT L;GOTO 30
81 BOX -27,0,3,3,3;RETURN
82 BOX -29,9,1,4,3;RETURN
83 BOX -52,0,1,1,3;RETURN
84 BOX -40,0,3,3,3;RETURN
85 BOX -17,0,1,1,3;RETURN
*(0)=108 *(1)=71 *(2)=108 *(3)=77 *(4)=83 *(5)=108
*(6)=108 *(7)=79 *(8)=77 *(9)=73 *(10)=79 *(11)=65
*(12)=108 *(13)=108 *(14)=108 *(15)=85
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