



# Planet Miners

## RULES

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### FOR:

ATARI 400/800<sup>®</sup>, 24K Memory  
Apple II<sup>®</sup>, Applesoft<sup>®</sup> Basic, 16K beyond Basic  
PET<sup>®</sup> 2001, 16K Memory  
TRS-80<sup>®</sup> Level II, 16K Memory

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### INTRODUCTION

PLANET MINERS is a very unique game about events which take place in the year 2050. In this year, the Mining Council of the Earth Federation of Governments has opened the solar system to mining. While the Federation itself is not empowered to engage in commerce, it has the authority to grant mining concessions to private concerns. These concerns are actually huge multi-national corporations which are extremely paternalistic (the Japanese system), called "families." Each corporation goes by the "family" name of its founder. Thus, the opening of the solar system for mining claims results in a scramble among the families for the available concessions.

### THE SOLAR SYSTEM

The PLANET MINERS is played in our solar system. As you probably know, there are nine planets in our solar system (known as of 1979), plus a scattering of planetoids in orbit between Mars and Jupiter. There is a collection of other junk (mostly comets and planetary satellites), but this game will be limited to the nine planets and one representative planetoid, Ceres.

When the game begins, the planets (and Ceres) are placed at fixed distances from the sun, but in random directions. As the turns progress, they will move in orbit, but this will not make much difference except for Mercury.

### Moving About in the Solar System

In the year 2050, interplanetary space travel will have evolved considerably over our primitive space vehicles of today. All space craft currently in use spend most of their time coasting along, with the occupants floating in "zero-g" (zero-gravity) or weightlessness. If you wanted to coast from Earth to Jupiter, for instance, you would fire your rockets for a very short time to give yourself an elliptical orbit around the sun with a perihelion (closest approach to the sun) at the orbit of Earth and an aphelion (furthest from the sun) at the orbit of Jupiter. You would have to time your departure very carefully to make sure Jupiter would be in the correct spot when you arrived, then settle back with a good book (or a hundred) and wait several years!

### Why Coasting is Impractical in the Long Run

These elliptical trajectories are used today because they are "minimum energy" paths. In other words, they provide the best payload-to-fuel ratio to deliver a probe to another planet. The problem is that these trajectories take a very long time (approximately the "year" of the planet furthest from the sun on either end of the path). For people, this is obviously not desirable because no one likes to be cooped up for that long, although the adventure inducement will probably attract enough volunteers until a better method is found.

### The Improved Method for Space Travel

The obvious solution to the problem is to invent a new kind of space ship which can leave its engines "on" for the whole trip. Actually, this is technically feasible using a nuclear-powered ion engine. Without getting into too much detail, the rocket engines used in PLANET MINERS can produce accelerations of 1 "g" (the same force you always feel pulling you to the ground) constantly for the time span of the game. This actually kills two birds with one stone: not only do the astronauts get where they are going sooner, but they also have comfortable Earth-like gravity all the way.

Let's discuss the physics of a constant "1-g" trip.

### How to Make a Trip Under Constant Acceleration

A naive space traveler with a "1-g" rocket engine might simply point his ship's nose toward his destination and blast away. This unfortunate fellow would find, however, that when he arrived there he would not be able to stop and would go zipping past! The best solution for him is to accelerate at 1-g half way there, turn the nose around, and decelerate the rest of the way, arriving exactly at a complete stop. The time it takes to make a trip like this is twice the time it would take to go halfway, accelerating the whole time.

The next consideration is to figure out how long it would take to get from point A to point B using this method.

### Travel Times Using Constant Acceleration

Going back to high school physics, recall that if a body undergoes uniform acceleration, it will travel a distance given by the following formula:

$$s = \frac{1}{2} at^2$$

where  $s$  is the distance,  $a$  is the acceleration, and  $t$  is the time. Turning the equation around, we see that the time it takes to get somewhere is proportional to the SQUARE ROOT of the distance. Thus, going from Earth to Jupiter with a constant acceleration of 1 g would only take about a week.

These considerations will help explain some of the details of PLANET MINERS which might otherwise be confusing. Let's discuss the actual rules now.

### Beginning the Game

When starting the game, the user will be asked for each "family" (there are four in the standard game) whether a person will play for that family. If the answer is "Y", then the computer will ask for a family name. Otherwise, the computer will assume that it is supposed to play for that family and it will make up its own name.

The computer initializes all planets and players. This includes determining the number of mining concessions at each planet, starting all family ships at Earth, initial placement of Earth patrol ships, and determining the "skill" or "finesse" value of each family ship. The importance of this last item will be explained later on.

### Special Considerations for Multi-Player Games

Note that the computer can play for as many of the families as desired, or none. It could even play a whole

game all by itself! If two or more persons are playing, they will take turns entering commands as directed by the computer. All players are allowed to look at the display at all times except when a person is entering commands.

During this time, the person entering commands is obliged to report to all players whenever a public announcement is made as a result of one of his commands (see below).

### Entering Commands

The families being played by the computer will have commands entered for them by the program, and so the only concern is how the human players can indicate to the computer what they want to do. The game is divided into turns which are each one day (Earth) in length. Each day, each person will be requested to enter commands. The commands are numbers corresponding to a menu. The menu is not normally displayed. However, entering a command 0 will cause the menu to be displayed. Players will typically enter many commands each turn.

The next sections describe the commands.

#### 1. (2.) Large (Small) Solar System Map

These commands cause a map display of the solar system to be put on the screen. The computer will list the planets by number and the player must type the number corresponding to the planet he wants in the center of the map.

The large display (if centered at the sun) will show all planets, with the inner planets crowded at the center. The small display will only go out about as far as Jupiter.

One feature of the map which will seem strange at first is that the distance on the MAP is proportional to the SQUARE ROOT of the distance in SPACE as measured from the planet in the center. In other words, the map is used to give a feeling for the TIME to get from the central planet to any other planet.

#### 3. Display Travel Times

This command will display a matrix containing the travel times (in days) from any planet to any other planet. The format is similar to automobile mileage charts that are available from the auto club.

#### 4. Display Mining Status

This command will display a matrix giving the mining concession status at every planet with columns for each family and the last column for claims not yet assigned.

#### 5. Display Ships in Orbit

This command will display a matrix containing the numbers of ships in orbit for each family at each planet. The number of Earth patrol ships is listed in the last column. Note that ships in transit are not listed on this display. Only the owning player knows where his ships are going—an important game feature.

#### 6. Display Ship Status

This command lists only the player's ships, but it gives complete data on the planet the ship is travelling from, the planet the ship is travelling to, and how many days to get there. An important parameter which is also listed is the "finesse" or "skill" of the crew and captain of that ship. This number is (usually) fixed and will prove useful for executing some of the other commands (or defending against them).

#### 7. Set Ship Destination

The player uses this command to set a new destination for one of his ships. The computer executes an automatic command 6, then asks which ship. If a correct ship number is typed, the computer will display the planets by number and ask for a destination. The computer will then set the ship destination and travel time.

Once a ship's course is set, it can be reset that day only. When a ship has left orbit and is in transit, its course cannot be reset. (This makes the game interesting and also simplifies the calculations.) When the ship enters orbit around its new planet, the course can be set again.

#### 8. Protest a Claim

This is the first of the commands used to try to grab claims away from the other families. A protest is made in the Mining Council to the effect that there has been some error in the filing of a claim. The Council considers the protest, influenced by the finesse of the protester and of the other family at Earth. If the council agrees with the protest, the claim will be made public. However, this can backfire by getting the Council irritated so that they will be less likely to give new mining concessions to the protester.

The computer will ask for the planet and family numbers for lodging the protest after displaying the choices. Simply type the proper number followed by RETURN (or ENTER).

#### 9. Attempt to Claim-Jump

This command attempts to snatch a claim directly from one family and give it to the player. There are two steps which must both be successful to accomplish this. First, there must be one or more of the player's ships at the planet where the claim-jumping is taking place. The finesse value at the planet is used to attempt to tamper with the claim marker beacons. The finesse of the other family at that planet (if any of his ships are there) is used to try to catch the tamperer. If any Earth patrol ships are at the planet, they will also attempt to capture.

There are three possible results of the attempted tampering. First, it can be successful, in which case play proceeds to the next step (see below). Second, it can fail but the agent escapes, which leaves suspicions and an unfavorable political climate on Earth. The third possibility is that the agent is captured. In this last case, if there are Earth patrol ships at the planet, one of them will escort the offending player's ship back to Earth, where it will be held for a number of days. If there is no patrol ship, the ship of the other family will take a day off to torture the agent for information. This will ADD one finesse point to the other player's ship and SUBTRACT one from the ship which attempted the tampering.

Note that there is no possibility of being caught if there are neither patrol ships nor ships of the other family at the system where claim-jumping is attempted.

Assuming that the attempt to tamper with the marker beacons is successful, the next step is to try to convince the Mining Council to transfer ownership of the claim. Here, the finesse value at Earth is used similarly to command 8. The only penalties for failure to convince the council are similar to command 8 (protesting a claim).

The computer will prompt for planet and family for the claim-jump in the same way as command 8.

#### 10. Attempt Sabotage

The purpose of this command is to attempt to sabotage a space ship of another family. The computer will ask for the planet and family in the usual way. After that, the sabotage will be attempted using the same basic procedure as claim-jumping. If it succeeds, the ion drive of the other ship will turn on and the ship will go out of control for a number of turns. The penalties for failure are similar to claim-jumping.

This is the only "sneaky trick" command which, if successful, leaves no indication of "who done it." In the case of multi-person games, the person who SUCCESSFULLY sabotages need not announce it. All other attempts are public knowledge.

## 11. Finished With Commands Today

This command signals the computer that the player is finished entering commands for this turn (only).

### Finesse (or Skill)

Finesse has already been mentioned in connection with entering commands. The finesse of a family at a planet is equal to the SQUARE ROOT of the SUM of SQUARES of his ship's finesse values at that planet. Thus, ships with finesse of 4 and 3 would have a total finesse of 5 (NOT 7).

Finesse at Earth is used to influence the Mining Council for favorable decisions. It is used in general to claim mining concessions at planets, claim-jump, and sabotage. Maintaining finesse at Earth is the cornerstone of any successful game strategy in PLANET MINERS.

### Getting Mining Concessions

The normal method for getting a mining concession in the first place is to have a ship at a planet with one or more unconceded mining claims. The program will automatically try to execute a mining claim for each ship at such a planet. However, it requires a favorable political climate at Earth (finesse) to be granted more than one mining concession per day. The finesse of the ship making the claim is also considered when evaluating the chances for success. A family which has executed commands 8 or 9 will never be granted more than one mining claim on the same day, regardless of the outcome.

### Ending the Game

The game ends when either all unconceded claims are gone or the Mining Council declares an end arbitrarily sometime after the 40th turn.

### The Winner

The winner is the family with the most mining claims at the end. The computer will print the results.

When one person plays alone against the computer and his best ship has a finesse (skill) of 5 or more, he should only consider it a victory if he gets more than all other families combined. The (impossible) goal to shoot for is to shut out the other families completely.

### EXAMPLES OF PLAY

This section gives some examples that will be useful for the computer game beginner. An important thing to keep in mind is that the computer expects the player to input his commands in a very precise format and terminate them by pressing the "ENTER" (or "RETURN") key. The computer is very literal-minded and can't make guesses about what was REALLY meant! (Note that there will be some very minor differences between the versions for the different computers, but all versions are very nearly identical.)

As the game begins, all ships (except patrol ships) will be at Earth. One of the first things a player might wish to do is to check the status of his ships. When it is his turn, the computer will display

### COMMANDS FOR THE JONES FAMILY ON DAY 1 YOUR COMMAND:

The computer is now waiting for a command. The "JONES" player would type

6 (ENTER)

and the computer would respond with

### STATUS OF JONES FAMILY SHIPS ON DAY 1

Ship	(Finesse)	From	To	Days To Go
1	(0)	Earth	Earth	0
2	(3)	Earth	Earth	0
3	(1)	Earth	Earth	0
4	(4)	Earth	Earth	0
5	(2)	Earth	Earth	0

### YOUR COMMAND:

The computer is waiting for another command. If the player wants to send a ship somewhere, he enters command 7:

7 (ENTER)

The computer responds with the ship status again (as above), then asks

### WHICH SHIP?

The player enters his choice:

2 (ENTER)

The computer will then display the planets and ask which one:

1-Mercury    2-Venus    3-Earth    4-Mars  
5-Ceres    6-Jupiter    7-Saturn    8-Uranus  
9-Neptune    10-Pluto

### YOUR CHOICE?

The player would then enter his choice:

6 (ENTER)

The computer would ask for the next command. If the player requests a ship status again, he will get

### STATUS OF JONES FAMILY SHIPS ON DATE 1

Ship	(Finesse)	From	To	Days To Go
1	(0)	Earth	Earth	0
2	(3)	Earth	Jupiter	7
3	(1)	Earth	Earth	0
4	(4)	Earth	Earth	0
5	(2)	Earth	Earth	0

While entering commands may seem difficult at first, a little experience will make entering them almost second nature. Note that the computer won't let you do anything against the rules, so don't worry about that!

### CASSETTE LOADING INSTRUCTIONS

#### ATARI 400/800

Lift the cartridge door on your ATARI 400/800 computer and insert the COMPUTING LANGUAGE BASIC cartridge into the computer. Use the LEFT CARTRIDGE slot on the ATARI 800 system.

Press the POWER switch on the side of the console ON. With SIDE ONE of the cassette up, put it into your ATARI CASSETTE RECORDER and press 'REWIND' until the tape stops moving. Using the keyboard, type:

#### CLOAD

Then press the 'RETURN' key on the keyboard. You will hear one beep. Push 'PLAY' on the recorder and press the 'RETURN' key on the keyboard again. The recorder should start to move and the program will be loaded. By turning up the volume on your video screen you can hear the program being loaded. When the tape stops, the program has been transferred from the cassette tape to the computer. 'READY' will be displayed on the screen. Type: 'RUN' and press the 'RETURN' key to play the game. The program has been recorded on the cassette twice to insure against errors in loading. Should your video screen display the word ERROR, press the RESET button at the top righthand corner of the keyboard and repeat all of the above loading instructions.

To assure a successful load on your Atari computer we suggest you advance the clear portion of tape (leader) until the brown magnetic portion is just visible to the left of the cassette head.

**APPLE II**

The APPLE program is located on SIDE ONE after the Atari program. There are two copies of the Atari program which must be skipped before the APPLE program can be loaded. By listening to the tape, you can tell the difference between the two programs. The APPLE program is easily recognized by the relatively high pitch and "pure" quality of the calibration tone at the beginning of the program. This tone is free of the characteristic Atari buzz. Find the beginning of an APPLE program and position the tape to just after the start of the calibration tone. Set up the recorder for input. On the keyboard, type:

LOAD (Don't hit 'RETURN' yet).

Press 'PLAY' on the recorder and immediately press 'RETURN' on the keyboard. The computer will start reading in your program. The computer will beep twice, once at the beginning of the program and once at the end. This program is not short and will take a few minutes to load. When you hear the second beep, type:

RUN

and press 'RETURN' to play the game.

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**COMMODORE PET 2001**

Turn the tape over so SIDE TWO is up. Insert the tape in your recorder and rewind to the beginning of the tape. When ready, type:

LOAD

and press the 'RETURN' button on the keyboard, then the 'PLAY' button on the recorder. The tape should start moving, and start loading your program. This program is not short, and will take several minutes to load. The computer will tell you when it finds the program and starts loading. When done, the computer will print 'READY', and the tape will stop. Type:

RUN

and press 'RETURN' to play the game.

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**CASSETTE LOADING INSTRUCTIONS**

**TRS-80**

The TRS-80 program is located on SIDE TWO after the PET 2001 program. There are two copies of the PET program which must be skipped before the TRS-80 program can be loaded. By pulling out the EAR and MIC jacks on the recorder and listening to the tape, you can differentiate the PET program from the TRS-80 program. The PET sounds louder, yet has a lower pitch. Both PET programs last approximately a total of 8½ minutes and are followed by a portion of blank tape which is your cue to prepare to load the TRS-80 program.

Check that the volume control is set to the proper level (between 5 and 6 is normal). Press 'PLAY' on the recorder, type:

CLOAD

(For Mod III only, enter: L after CASS?, then CLOAD)

and press the 'ENTER' key on the keyboard. The recorder should start to move and your program will be loaded. This will be indicated by the flashing asterisk at the upper right corner of the screen. This program is not short, and will take several minutes to load. When the tape stops and the TRS-80 prints 'READY' on the screen, type:

RUN

and press 'ENTER' to play the game.

1. Check your equipment carefully to be sure that all cables and connections are correct.

2. Re-read the section in your computer's manual that tells you how to load a tape. Try to load the tape again.

3. If you can adjust the volume on your recorder, try different settings, both higher and lower.

4. Each program is recorded twice on the tape, one recording right after the other. By listening to the tape, find the beginning of the second recording and try to load it.

5. If possible, load another program from a tape you know works on your computer. This will prove that your equipment works. Try once more to load your game.

6. The normal reason tapes will not load is tape recorder head misalignment. Your computer may be able to save and load programs on its own recorder, but be unable to read tapes made on a different recorder for this reason. Be sure your recorder heads are correctly aligned. Your local computer store or dealer can help you with this.

7. If the program still cannot be loaded, send the cassette, with a complete description of the problem (what type of computer you have, what the computer says, if anything, when you try to load the cassette or play the game and what you did to try to get it to load.) to:

**Avalon Hill Microcomputer Games**

4517 Harford Road  
Baltimore, Maryland 21214

Defective cassettes will be replaced.

**After the program is loaded**

Once you have your program loaded, it is a good idea to make a backup copy (for your own use). Follow the normal procedure for saving a BASIC program in your computer's manual.

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**QUESTIONS ON PLAY**

The clarity of these rules has been verified by *Software Testers of Universal Microcomputer Programmers (STUMP)* and deemed "complete" in all facets of instruction. Please re-read them in areas that seem unclear at first reading. Questions on play can be answered by the factory *only* upon receipt of a self-addressed envelope bearing first-class postage.

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