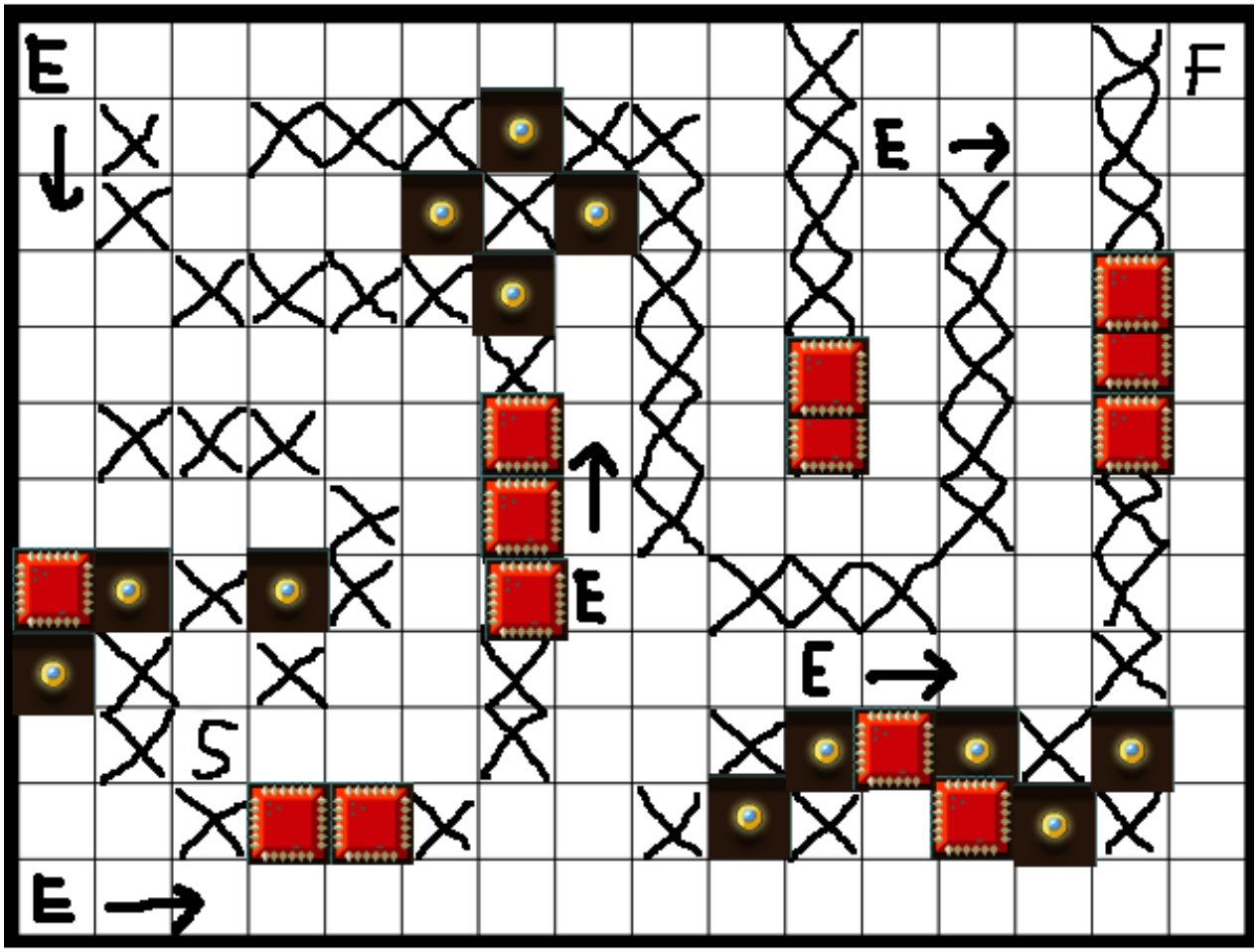
# Beginning Game Design

**Eric Keylor**




Prototype Instructor Manual
December, 2008

# Table of Contents

## Let the Games Begin!

This is an introduction to some fundamental game design concepts. Game programs are emerging in universities all over the world, and the video game industry is almost certain to expand over the next several years—possibly growing larger than the film industry. Since video games are becoming an increasingly popular and profitable medium, game design is now an art form that must be taken seriously.

Game design can be taught. Teachers, however, may be intimidated by game design since they may not consider themselves "gamers" or may not have access to appropriate materials. This module is designed to support teachers who want to introduce their students to game design. The module is appropriate for middle school students, but it may be used for older students as well. It consists of four steps, and the first three steps are designed for an hour-long class. The fourth step is optional and may be taught at another time.

The module is based on the video game, GamestarMechanic, which is designed to teach middle and high school students game design. Although the module is aligned with this software, it can be used as a stand-alone unit. The students will be creating board games, which can be played without being implemented in GamestarMechanic.

The module assumes specific design constraints and teaches specific concepts. Students make board games that can be implemented in GamestarMechanic. The size of the board game is limited to a 16 by 12 grid, so it will be easy to see the entire design at a glance. No aspects of the design will be hidden. Although the board may seem small, there will be plenty of challenges to consider. Here are the game design concepts that will be taught

1. How to create a game space.
2. How to put objects in the game to influence the player.
3. How to add and place traps in the game.
4. How to add and place enemies in the game. (Optional)

Additional ideas for lessons are provided in the final section of the module, Level Up.

So let's get started!

**Materials**

Instructor Manual
Student Manual
Token and Blank Game Board Master Sheets (See Appendix)
PowerPoint Slides (Optional, but recommended)

Each student should have the following:

Student Manual
Blank Game Boards (at least 4 per student)
Paper Tokens
Dice (one die per student)
Pencils
Colored Pencils (Optional)

**Preparation**

Paper tokens are provided in the appendix. Be sure that the tokens are cut out prior to instruction. Each student should have

1. A single die.
2. At least 25 red block tokens.
3. At least 25 point tokens.
4. At least 10 enemy tokens
5. A player token
6. A finish token.

Customizable PowerPoint slides are provided for your convenience.

You may want to make a few copies of the sample solution for the steps in the appendix. If a student is having difficulty and needs an example to continue, you may provide the student with the sample solution.

It is highly recommended that you take some time to practice making a design before teaching the module.

**Summary of Objectives**

Objective 1: Game Space Design

The student will create a playable game design based on the following criteria:

1. There is a path from start to finish, so the player can complete the game.
2. All available space is used.
3. The path from goal to finish has at least four bends and is at least 10 squares long.
4. There are at least three dead ends, loops, or both.

Objective 2: Collection Mechanics and Indirect Control

The student will implement a collection mechanic that makes full use of the game space and demonstrates indirect control using the following criteria:

1. There must be at least four points.
2. Four points must be at least 10 squares (along a path) from each other.
3. Indirect control must be used to influence strategy.
4. The player must visit almost every square.

Objective 3: Using Traps

The student will place traps in the game to provide challenge for the player using the following criteria:

1. No more than 25 red blocks (traps) can be used.
2. No more than 3 red blocks can be put in a "danger zone."
3. No more than 5 separate danger zones can be next to each other.

(Optional) Objective 4: Using Enemies

The student will place enemies in the game to provide challenge for the player using the following criteria:

1. No more than 10 enemies may be used.
2. Enemies must be spaced at least three squares apart initially.

**Introduction**

I. Introduction:

0. Before beginning, make sure that all students have the following materials:
    - A student manual.
    - Paper tokens, one die, and a pencil. (See Materials above.)
    - At least four blank game sheets.

1. Tell the students they will be learning about game design. The concepts they will learn will apply to many different types of games including video games.

2. Tell them they will create board games that can be implemented in GamestarMechanic. The games can also be standalone games that they can continue to develop.

II. An Example:

1. Tell the students that their board game is an example of a paper prototype and give them the following definition:

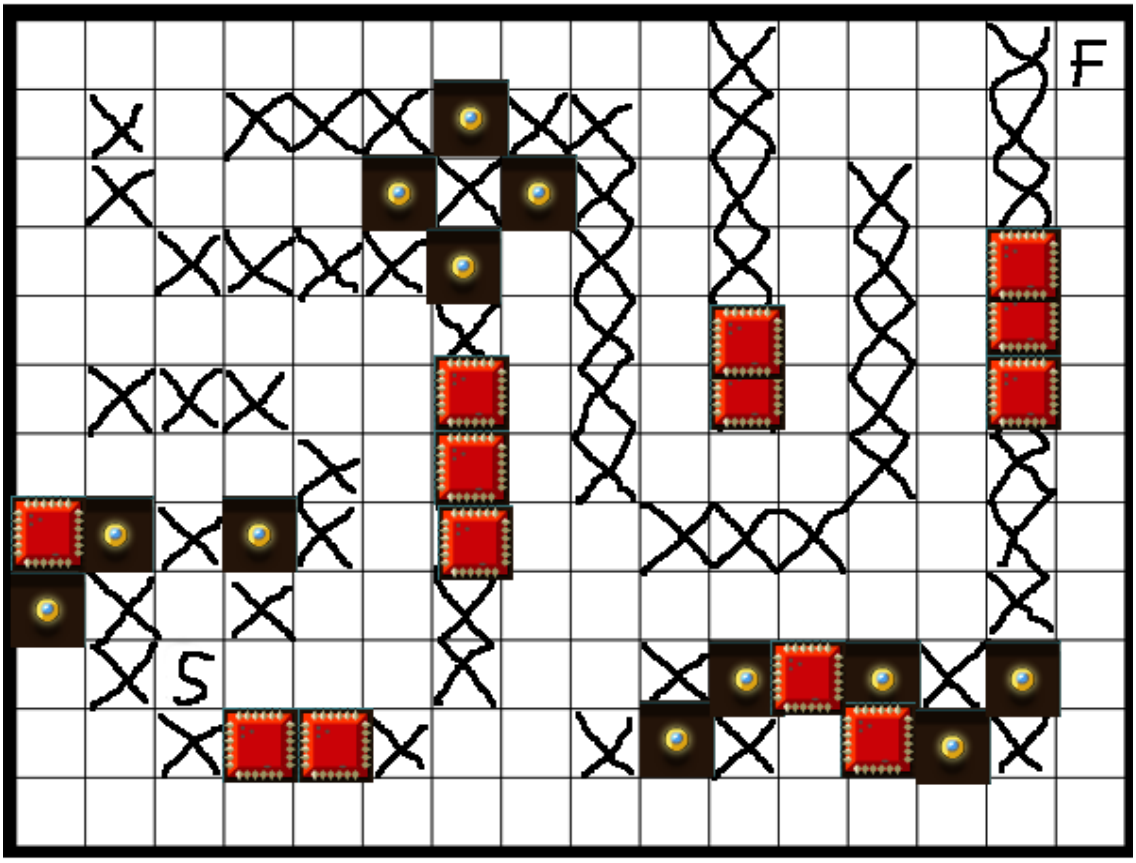
   *Paper prototype*: A preliminary design done in paper form to see if a design works.

2. Emphasize the following concept:

   Paper prototypes are fast, inexpensive, and give feedback before putting time and resources into a full design.

3. Ask the students to turn to page 5 to discuss Example 1. Tell them their board game will be similar to this example at the end of step 3.

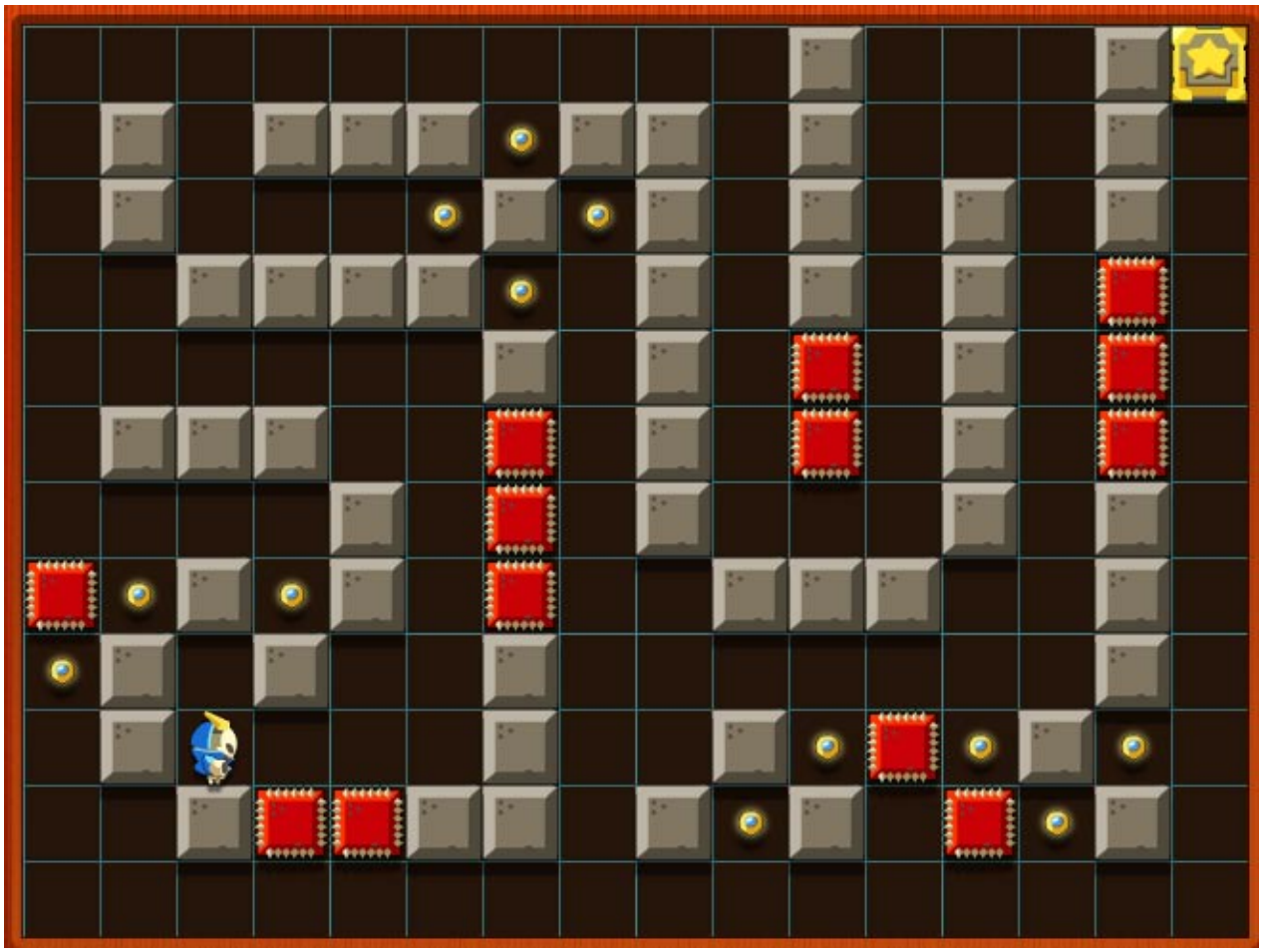
Example 1. A prototype board game. (Student manual page 5)




4. Describe the parts of the board game as follows:
    - The “S” is where the player starts.
    - The “F” is where the player finishes.
    - Each “X” represents a block that is a wall.
    - The red spiky blocks are traps that can damage the player.
    - The dots are points for the player to collect.

5. Ask the students to turn to page 6. Explain that the following example is what the game would look like in GamestarMechanic.

Example 2. The Board Game Made in GamestarMechanic. (Student manual page 6)



6. This completes the introduction. Ask the students to turn to page 7 to begin Step 1.

**Step 1: Making a Game Space**

I. Introduction to Game Spaces:

0. Remind the students to turn to page 7 in their manuals.

1. Tell the students that all games take place in a space.

2. Ask the question: Can you describe some game spaces?

   Possible Answers:
   1. Sports like baseball and football are played on a marked field.
   2. Video games (e.g. action and role-playing and massively multiplayer online games) often take place in 3D (three dimensional) worlds.
   3. Video games (e.g. casual games, classic arcade games) also take place in a 2D (two dimensional) space.

3. Tell the students they will make a board game that can be implemented as a 2D game. Give them the following definition of game space:

   *Game Space*: The physical or virtual game space in which someone plays a game.

4. Emphasize the following about game spaces:

   A well-designed game space can give a player choices and a sense of freedom. A poorly designed game space can make the player feel restricted and may make the player bored.

5. Tell the students that they will be given rules to help them design their games.

II. Rules and Examples for Game Spaces

1. Give the students the following rule:

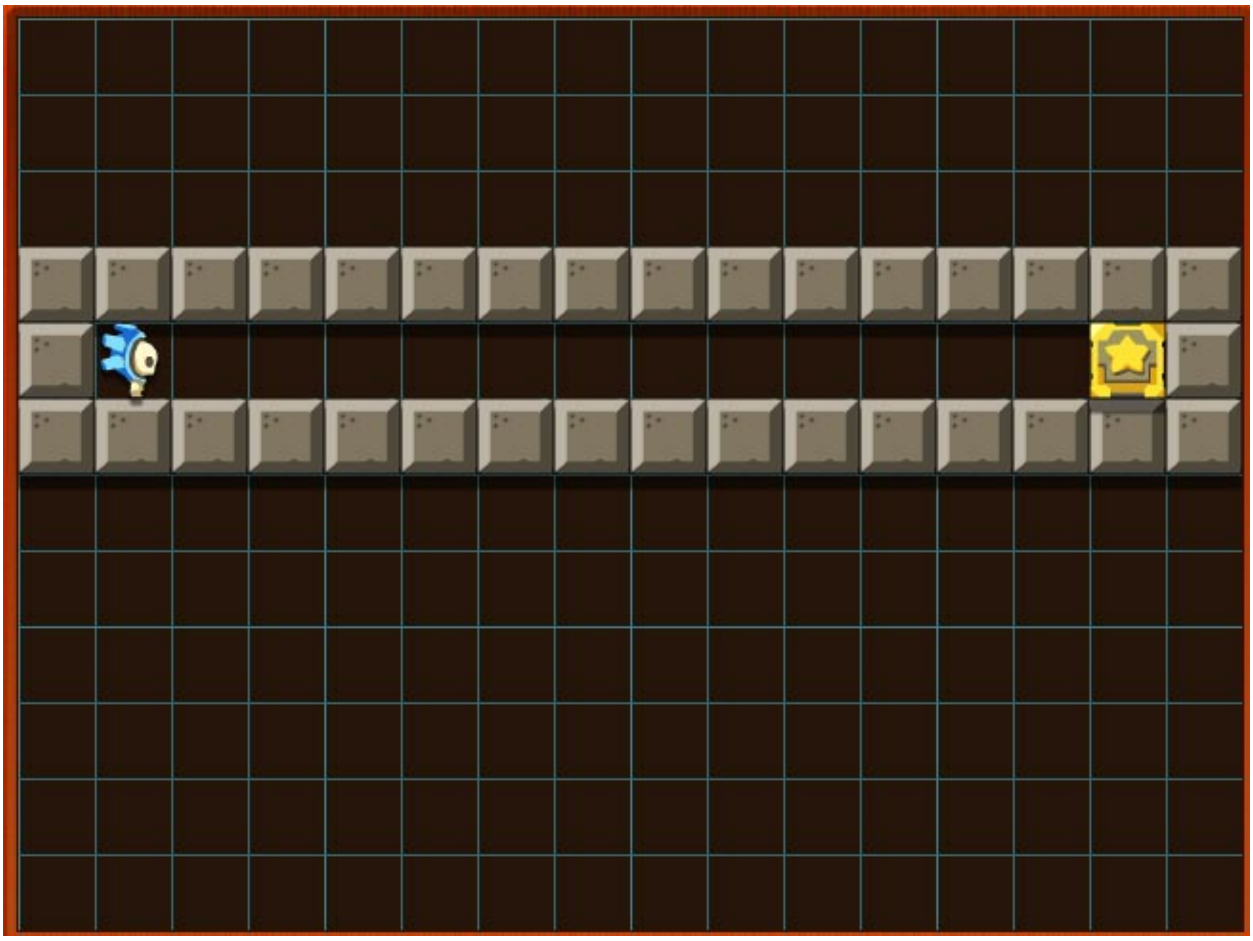
   Rule 1: Make a Path from Start to Finish. (Design a Space the Player Can Complete.)

2. Emphasize the following reasons for Rule 1:

   No one will play a game that can't be won. Since the game they will make is on a small board, it will be easy to see if the game can be completed. If the students make larger games in the future, they may have to check to make sure a game can be completed.

3. Ask the students to turn to page 8 to discuss the following example.

Example 3. A Bad Design. (Student manual page 8)



4. Ask the question: What is wrong with this example?

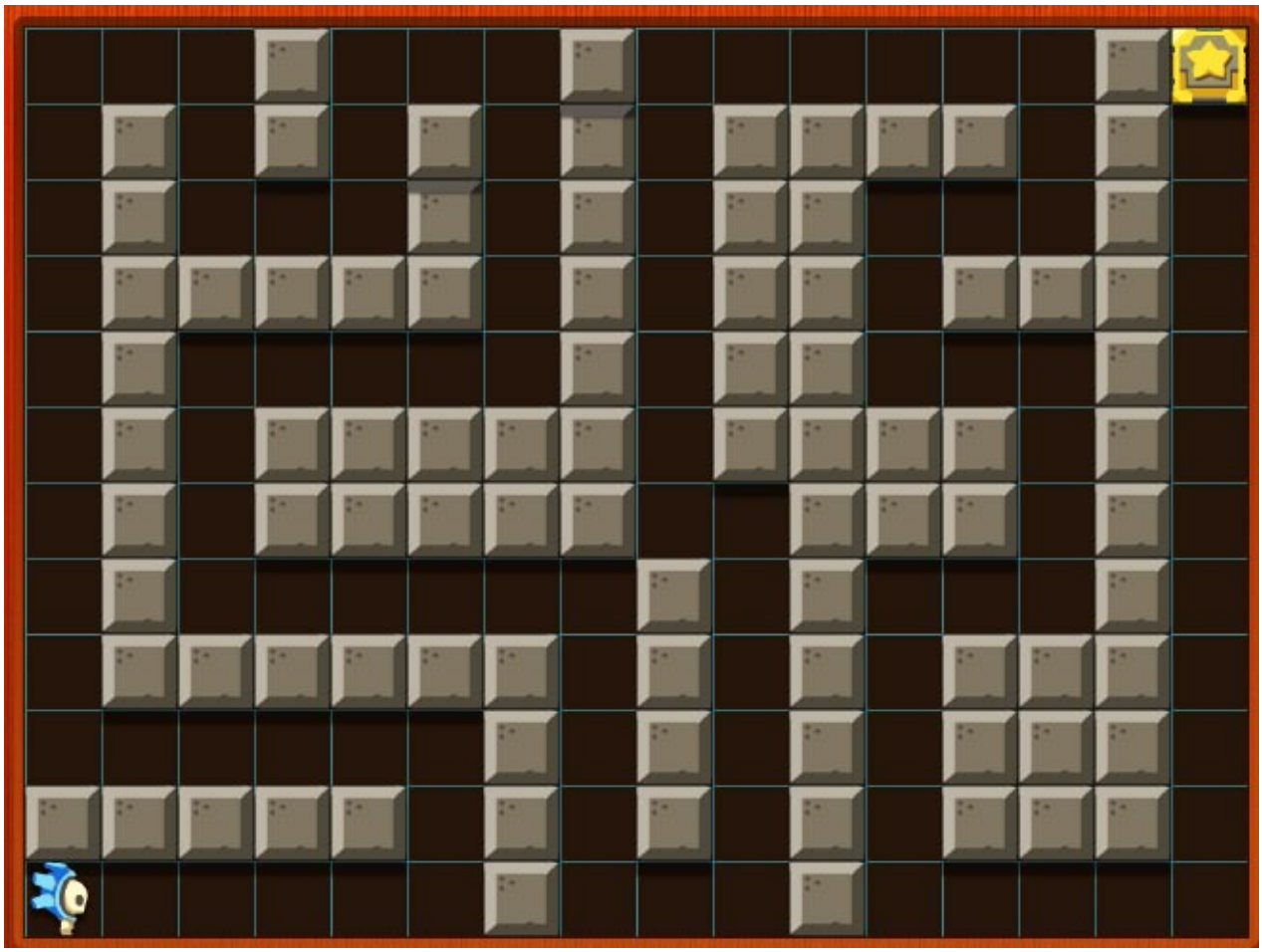
   Possible answers:
   1. The game is too short.
   2. The player has no choices.
   3. There is nothing for the player to do.
   4. The game is too easy. There are no obstacles.
   5. The game is boring.

5. Ask the question: Do you have ideas for making Example 3 more interesting?

   Possible answers:
   1. Make the path longer.
   2. Add bends, dead ends, and loops.

6. Ask the students to turn to page 9 to discuss Example 4.

Example 4. A Better Design. (Student manual page 9)



7. Ask the question: How is this better than the previous example?

   Possible Answers:
   1. This game uses the entire space.
   2. There is more for the player to do.
   3. The game is longer.
   4. The game is harder.

8. Introduce the following idea:

   A designer should use all the available space when creating a game space.

9. Give the following rule:

   Rule 2: Use All the Available Space.

10. Emphasize the following purpose for Rule 2:

    Using all the space gives the player more opportunities.

11. Introduce the following idea:

    It would be useful to define how far a player has to go from start to finish.

12. Give the following rule:

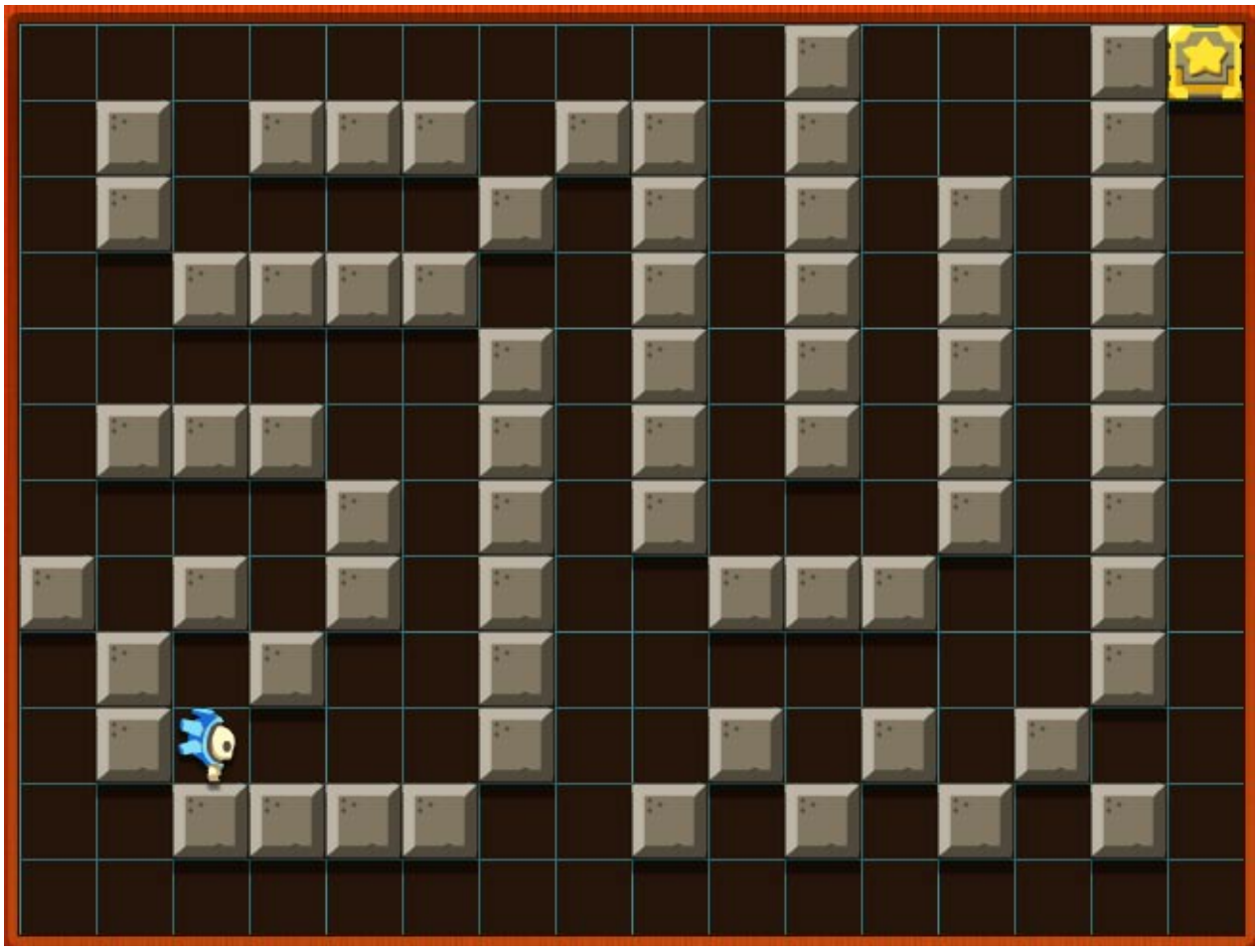
    Rule 3: The path from start to finish should have at least four bends and be at least 10 squares long.

13. Emphasize the following purpose for Rule 3:

    This rule helps guarantee that the game will not be too short and that a large portion of the game space will be used.

14. Ask the students to turn to page 10 to discuss the following example. Emphasize the dead ends in the design.

Example 5. A Good Design with Dead Ends. (Student manual page 10)



15. Ask this question: Why are dead ends useful?

    Possible answers:
    1. They force the player to make strategic decisions.
    2. They force the player to take risks.
    3. They can be places for a player to hide.
    4. They can be the source of a puzzle. (Might have to wait for an enemy to move.)
    5. They can be traps.
    6. They can be locations for objects.

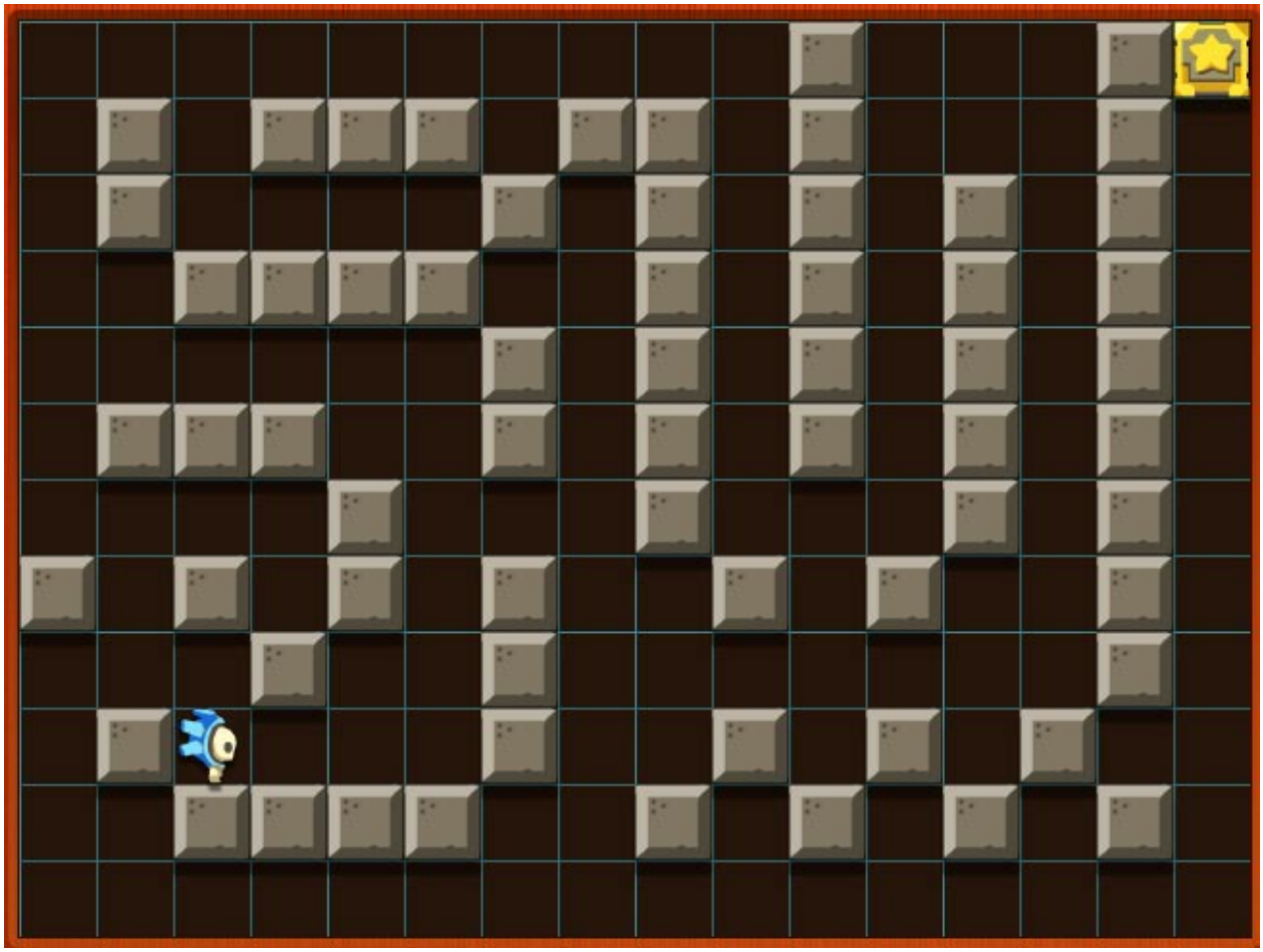
16. Ask this question: What are the drawbacks of using dead ends?
    Possible answers:
    1. The player could be trapped and lose.
    2. They can be a source of frustration if the player doesn't have a chance to get out of them.
    3. They can make the game too hard.

17. Pose the following Idea:

    Dead ends are not the only way to add interest to a game space. Loops are good, too.

18. Ask the students to turn to page 11 to discuss the following example.

Example 6. A Good Design with Loops and a Few Dead Ends. (Student manual page 11)



19. Ask this question: Why are loops useful?

    Possible answers:
    1. Loops give the player alternative choices to make.
    2. Loops increase the number of possibilities to win and allow more strategies.
    3. Loops give the player a sense of freedom.

20. Give the following rule:

    Rule 4: Include At Least Three Dead Ends, Loops, or Both

21. Emphasize the following purpose for Rule 4:
    Dead ends and loops add interest to game spaces.

III. Practice 1: Designing Your Game Space (Time: 5 – 10 Minutes)

1. Ask the students to turn to page 12 for Practice1.

2. Make sure that each student has at least two black game board sheets.

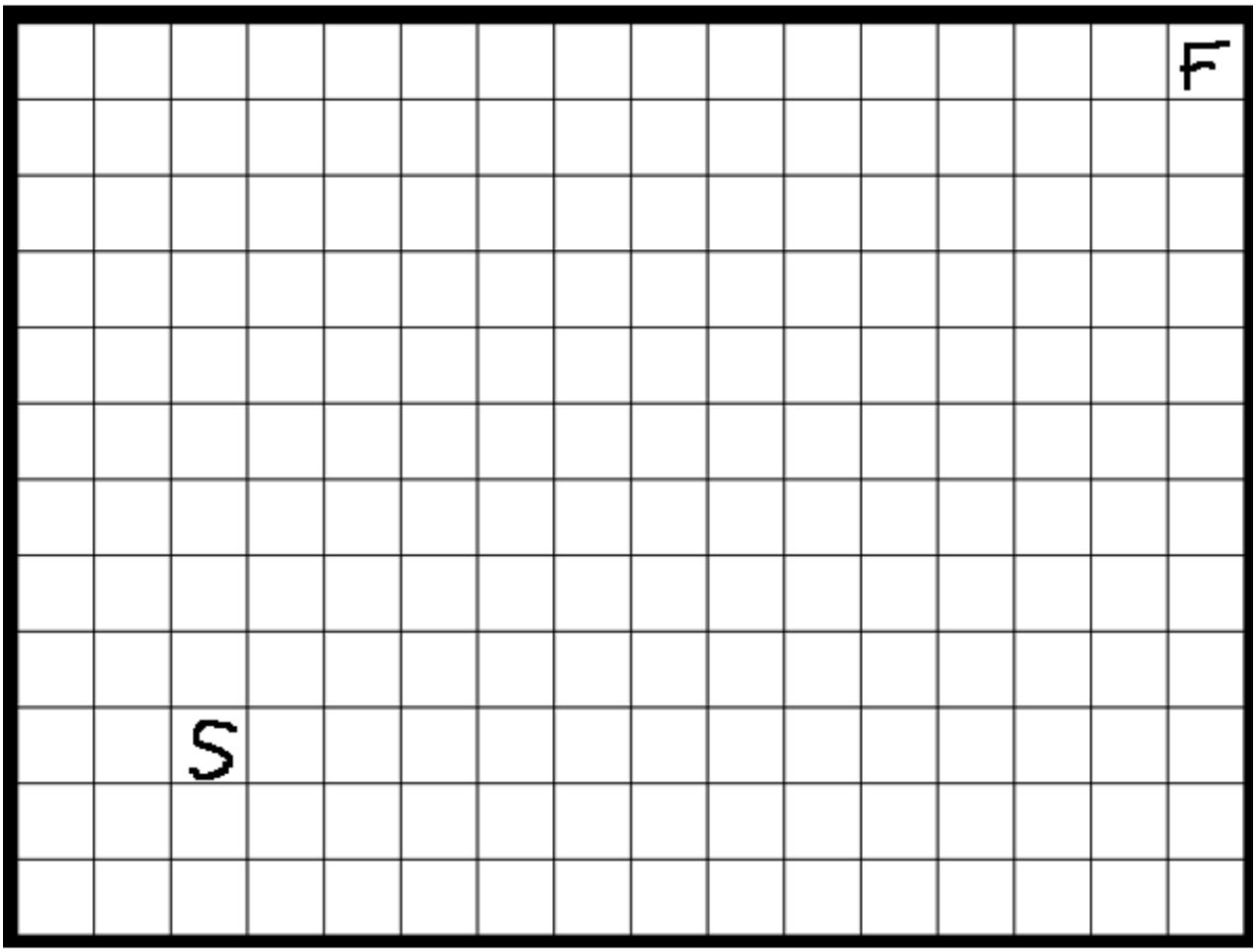
3. Tell the students that they will be creating a game space using the following rules:
   1. There is a path from start to finish, so the player can complete the game.
   2. All available space is used.
   3. The path from goal to finish has at least four bends and is at least 10 squares long.
   4. There are at least three dead ends, loops, or both.

4. Ask the students to turn to page 12 and look for the "Design Tips" section.

5. Ask the students to look at Example 7. Tell the students to put an "S" where they want the player to start and "F" where they want the player to finish on the game board. **The "S" and "F" should not be next to each other.** (They may find it easier to start with the top game board.)

6. Tell them that their board may look something like Example 7.

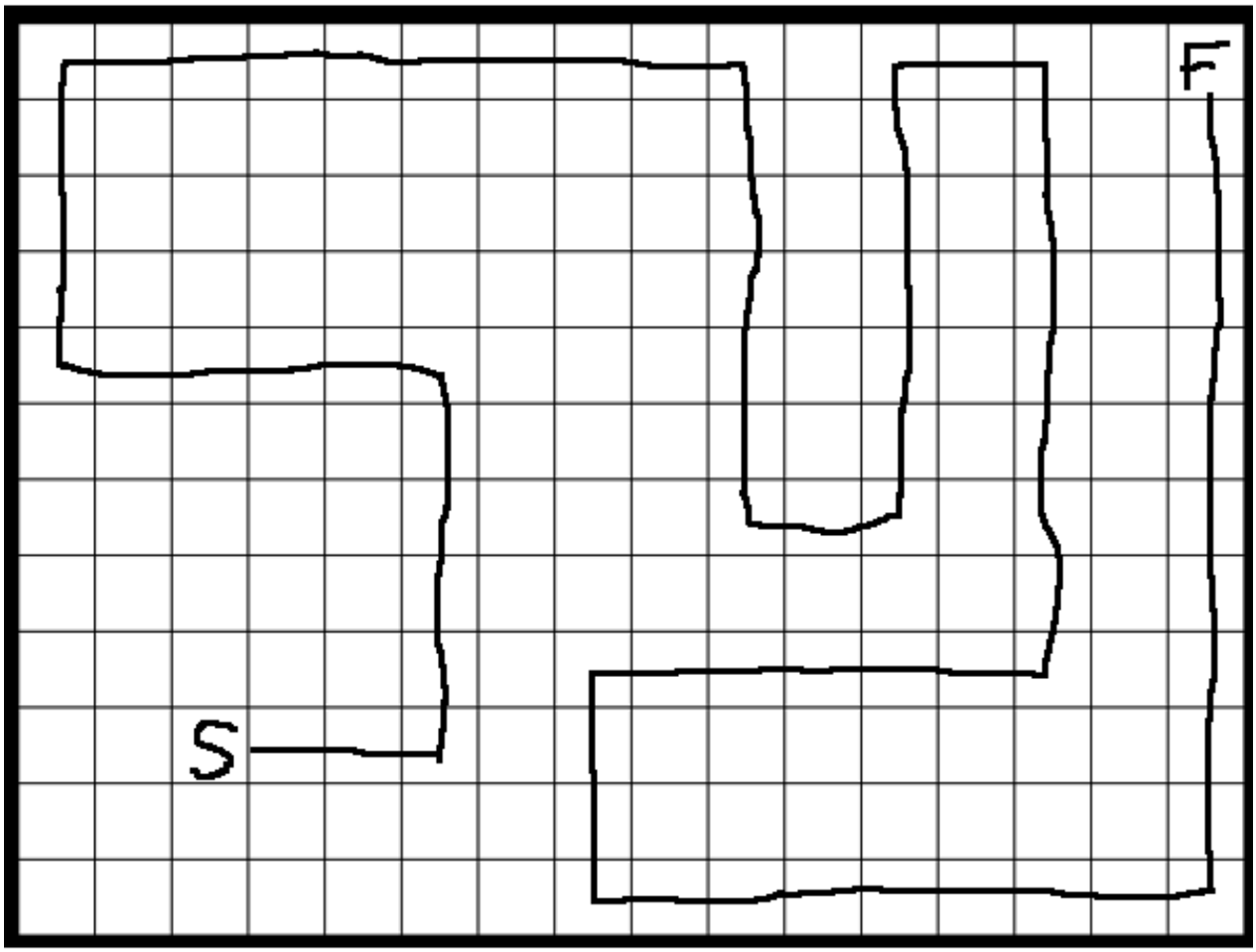
Example 7. Choosing Start and Finish Squares.



7. Ask the students to turn to page 13.

8. Tell the students to draw a path from “S” to “F” using the rules (at least 4 bends and 10 squares long). The path should look something like Example 8.

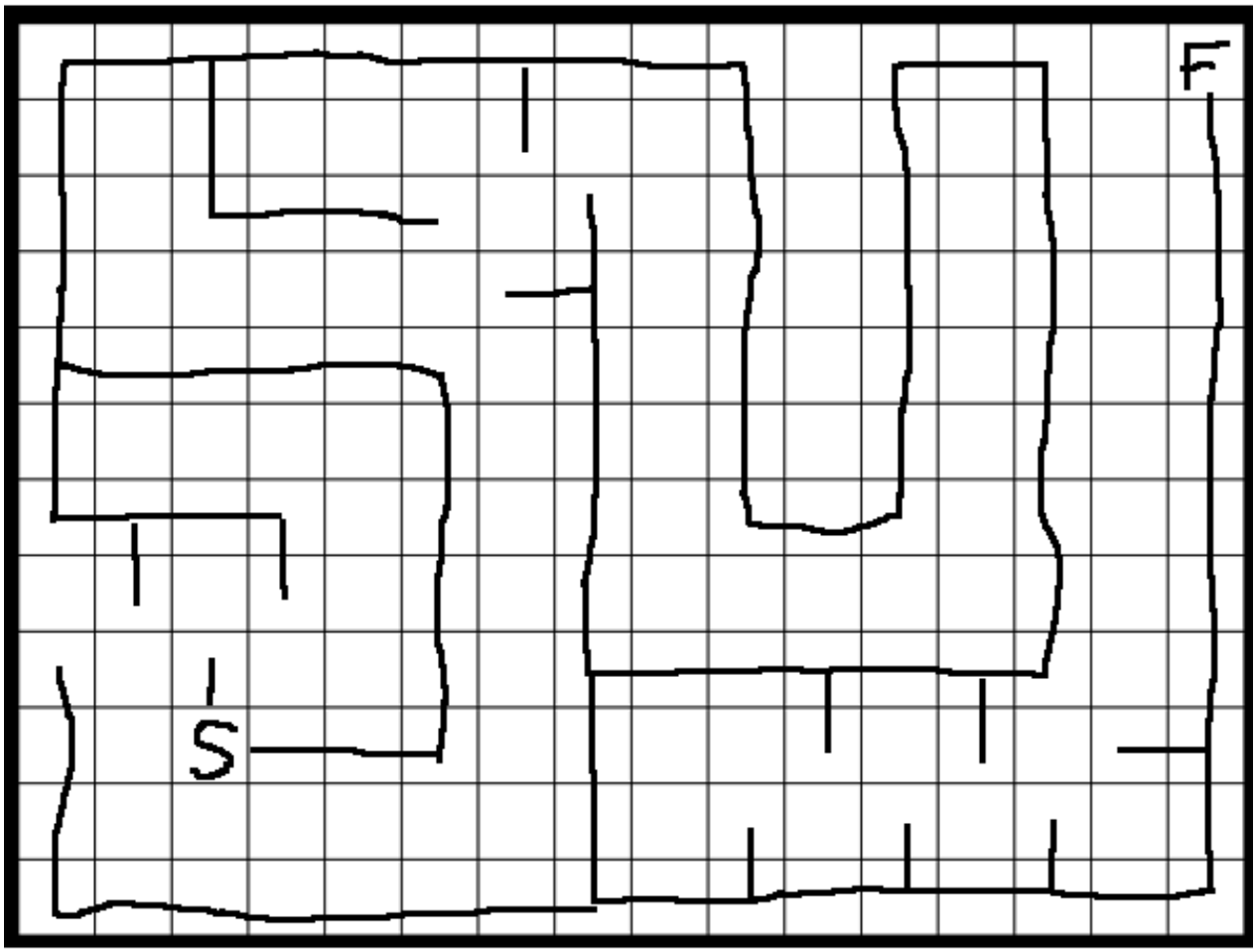
Example 8. Drawing a Path. (Student manual page 13)



9. Ask the students to turn to page 14.

10. Tell the students to add dead ends, loops, or both, and their board should look something like Example 9.

Example 9. (Student manual 14).

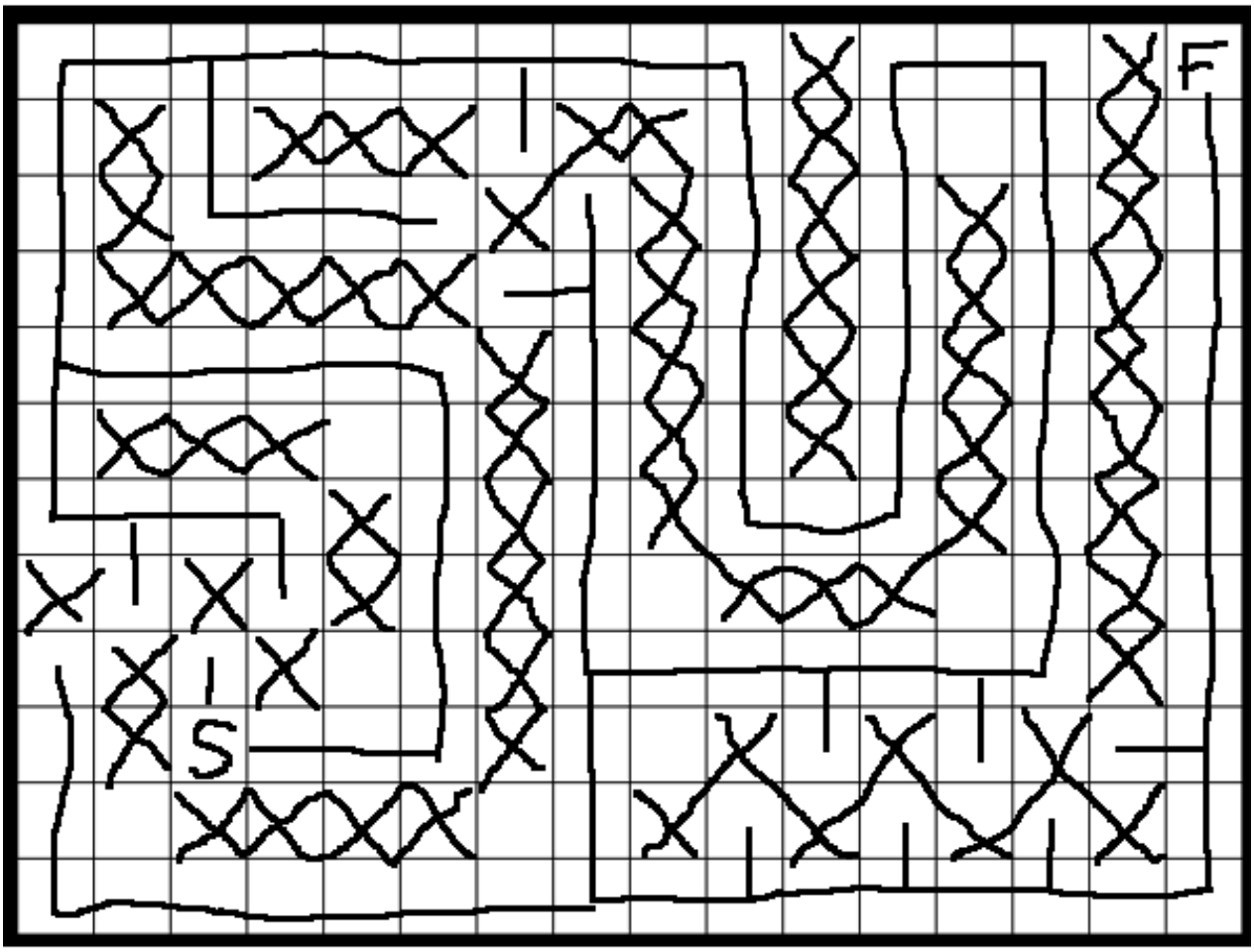


11. Ask the students to turn to page 15.

12. Tell the students to fill in the empty squares with X's. They could also shade the empty squares, too.

13. Tell them that their boards should look something like Example 10.

Example 10. Sketching the Blocks. (Student manual page 15)

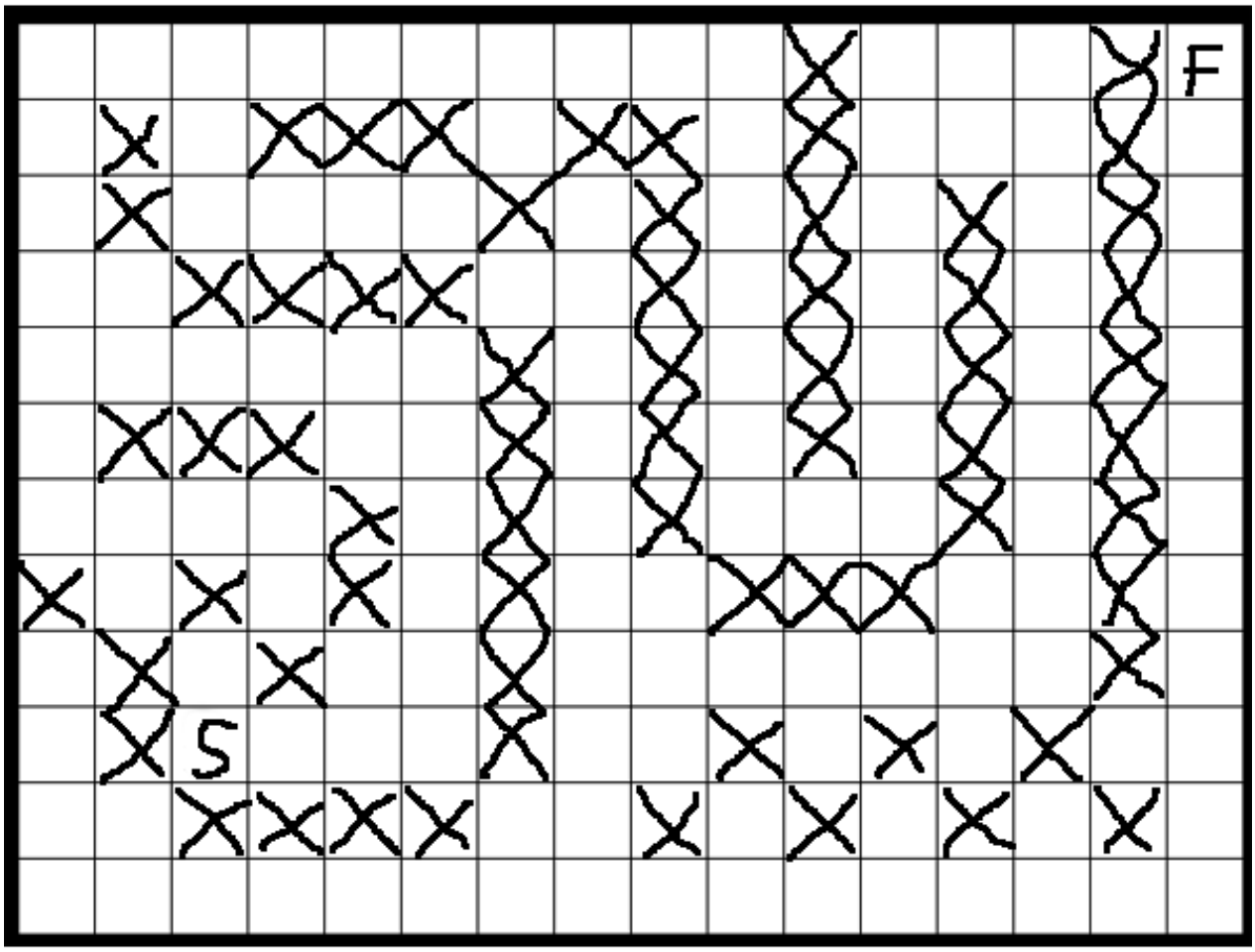


14. Ask the students to turn to page 16.

15. Tell the students to redraw their boards without the lines going along the path on either a new game board sheet or on the second empty board on their current game board sheet.

16. Tell them that the board should look something like Example 11.

Example 11. A Clean Copy of the Design. (Student manual page 16.)




17. Tell the students to look at the checklist on page 16. They should now review their boards and go through the checklist to see if all of the rules have been followed. If not, they should correct their designs.

18. Walk around the room and help students as necessary.

19. If a student is having serious difficulty and cannot catch up. You may want to provide the student with the pre-made Step 1 board that is provided in the appendix.

**Step Two: Using a Collection Mechanic and Indirect Control**

I. Introduction

1. Ask the students to turn to page 17, Step 2: Using a Collection Mechanic and Indirect Control.

2. Tell the students that the key to a good game is creating something fun for the player to do since the player will perform actions that will be repeated over and over again. These actions are game mechanics.

3. Give the following definition of a game mechanic:

   *Game Mechanic*: An action that a player does over and over again during a game.

4. Emphasize the following concepts about game mechanics:

   The game mechanic is the thing that makes a game fun and engaging. A game can have more than one game mechanic, but usually one mechanic is more important than the others.

5. Give the following definition for collection mechanic:

   *Collection Mechanic*: A game mechanic in which the player must collect objects.

6. Tell the students they will use a collection mechanic in their design. The player will collect points (dots) to win. The player can only go to the finish after all the points are collected.

7. Emphasize the following concept about collection mechanics:

   Placing the points in the space is very important. The points influence how the player moves through the space and forms strategies to win.

II. Rules and Examples

1. Give the following rule:

   Rule 1: Use at least four points (dots)

2. Emphasize the following about the Rule 1:

   Using four points (with conditions) will make the player move through as much of the game space as possible. The student can use as many points as he or she wants, but four points is the minimum amount.

3. Give the following rule:

   Rule 2: Four points must be at least 10 squares (along a path) from each other.

4. Give the following explanation:

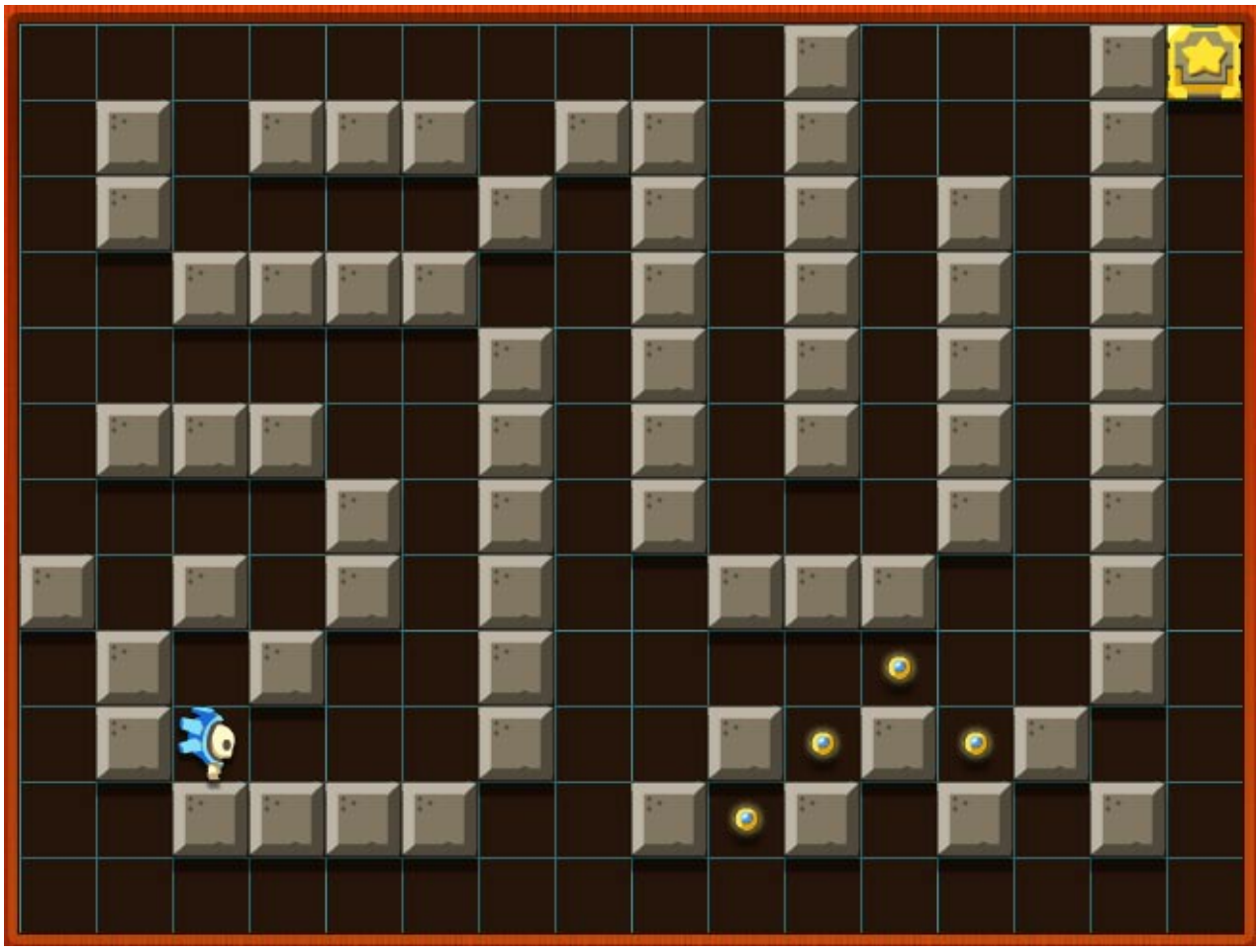
   Ten squares means that the player has to move ten squares to go from one point to another. This does not mean that every point must be ten squares apart. It just means that AT LEAST four points must be 10 squares apart.

5. Emphasize the following about Rule 2:

   The purpose of this rule is to make sure that points are widely distributed. The reason for this rule is to encourage the player to explore the game space.

6. Ask the students to turn to page 18 to discuss Example 12.

Example 12. The points are too close, and the points are not used in an interesting way.
(Student manual page 18)



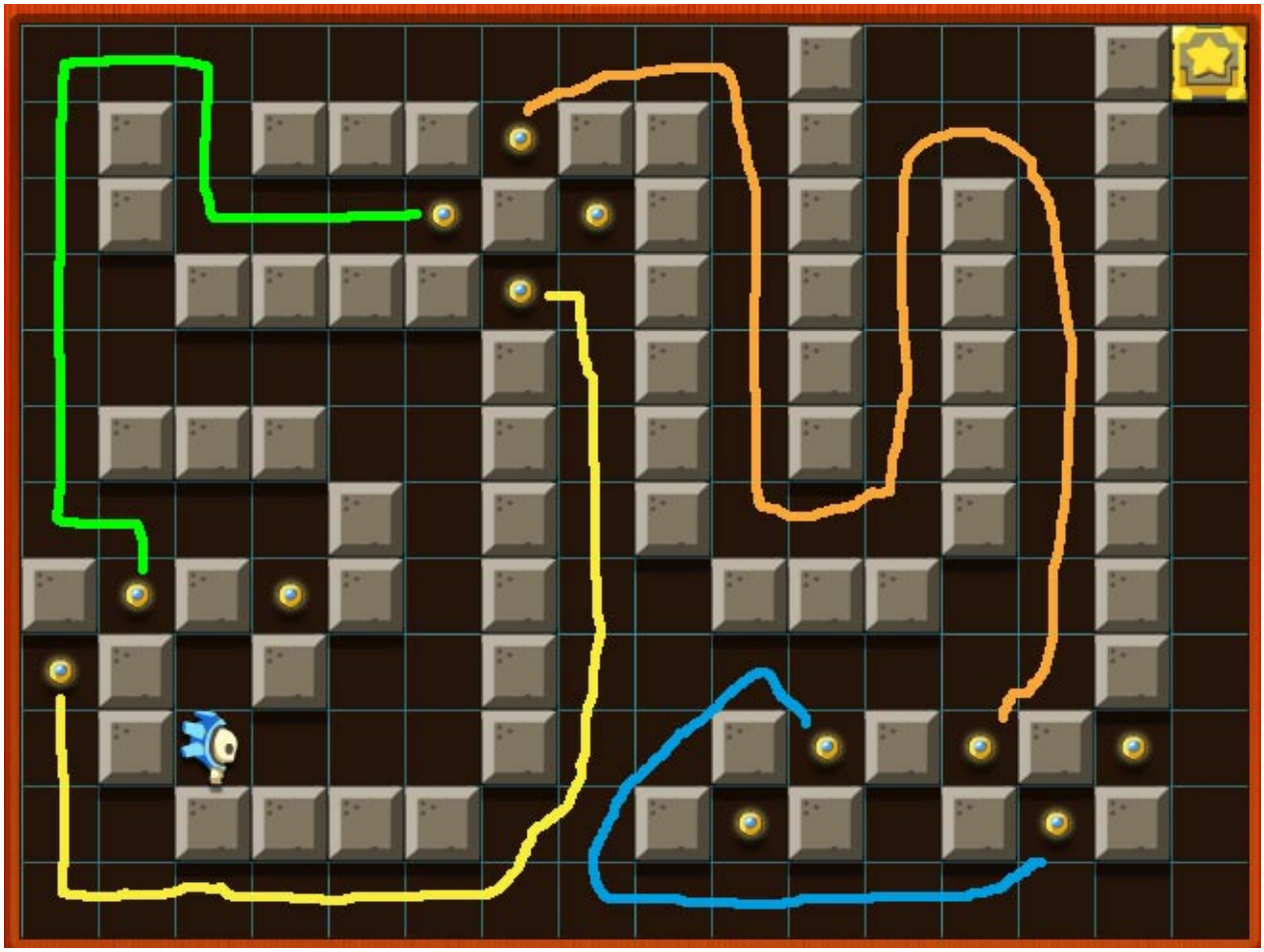
7. Ask this question: Does Example 12 follow the rules?

   Answer: No, and the player may never explore the dead ends.

8. Point out that all points are less than 10 squares apart. (Remember that players can move diagonally.)

9. Ask the students to turn to page 19 to discuss Example 13:

Example 13. A good placement of points and good use of indirect control. The player must explore the entire game space.



10. Point out that the color lines represent points that are at least 10 squares apart. Therefore, this example follows the rules. (These are not the only pairs of points that are at least 10 squares apart.)

11. Introduce this idea:

The position of the points influences the decisions the player will make and determines where the player will go. Influencing the player, without the player knowing it, is indirect control.

12. Give the following definition of indirect control:

Indirect Control: When the game designer controls the player's choices without the player knowing it. This is usually done by setting goals for the player and using visual cues.

13. Give the following rule:

    Rule 3: Use indirect control to influence strategy.

14. Emphasize the following about Rule 3 and indirect control:

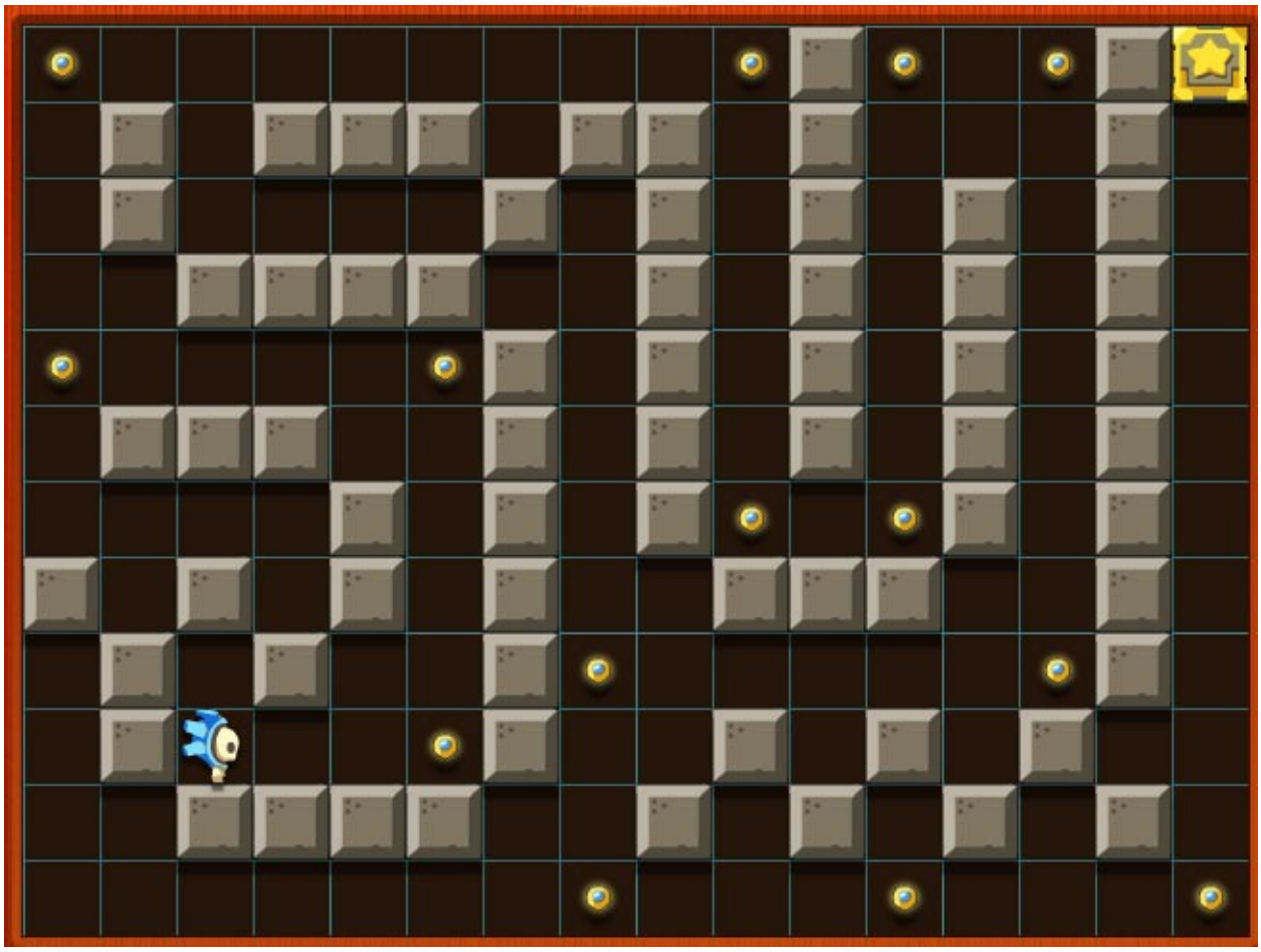
    Indirect control gives the illusion of freedom. Complete freedom in a game is impossible. Indirect control makes the player do what the designer wants the player to do, but the player thinks he or she is making free choices while playing.

15. Present the following idea:

    Use indirect control to make the player visit as much of the game space as possible.

16. Ask the students to turn to page 20 to discuss Example 14.

Example 14. Is this a good use of indirect control? (Student manual page 20)



17. Ask this question: Is Example 14 a good use of indirect control?

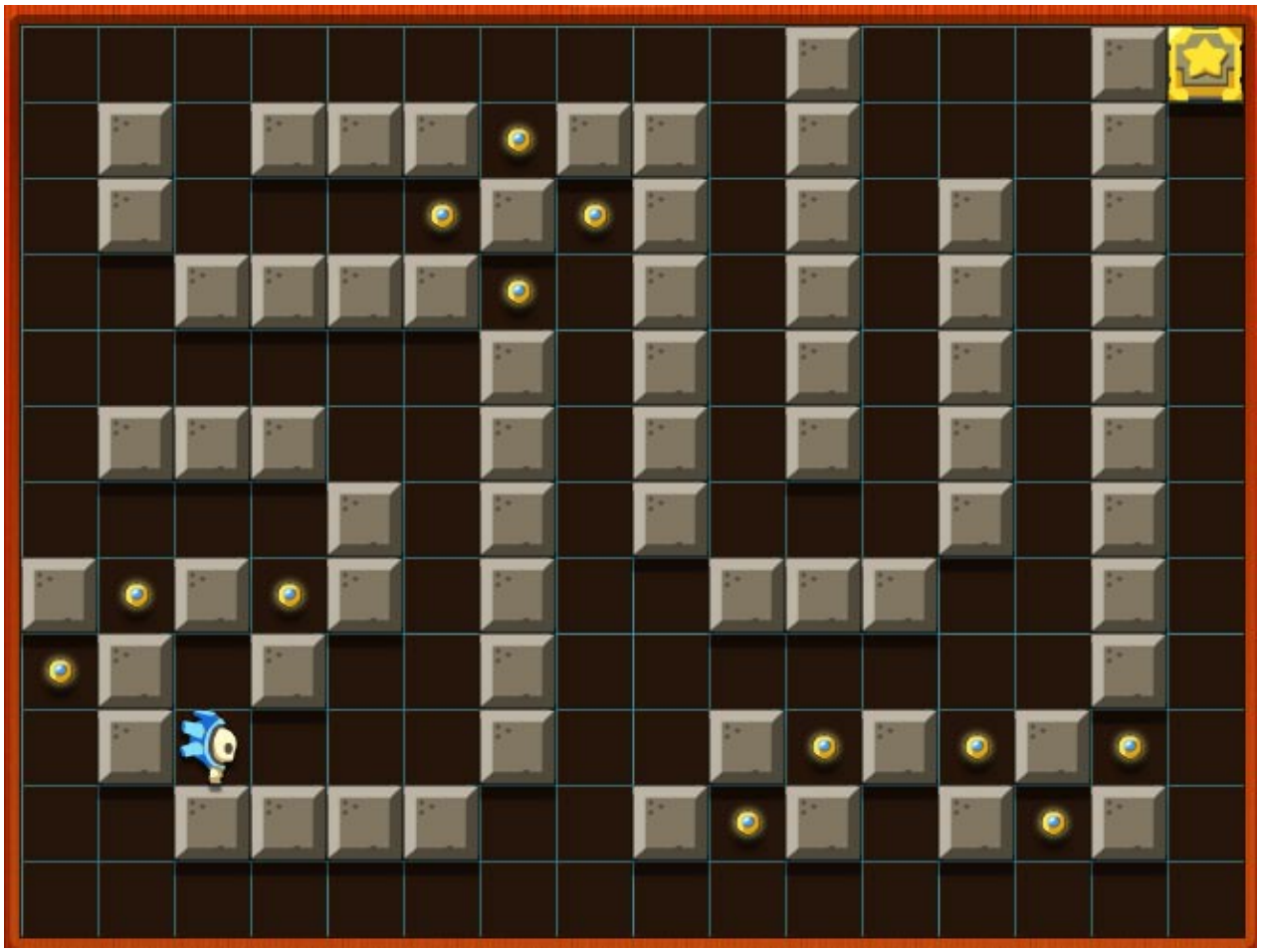
    Possible Answers:
    1. No, all the points are along a direct path to the finish.
    2. No, the player has no reason to take any of the dead ends.
    3. No, the dead ends might as well not exist.

18. Ask this question: How can Example 14 be improved?

    Answer: Put the points in different places other than the solution path. For example, put some points in the dead ends and other squares.

19. Ask the students to turn to page 21 to discuss Example 15.

Example 15. A good use of indirect control. (Student manual page 21)



20. Ask this question: Why Is Example 15 a good use of indirect control?

    Answers: The player must explore almost every square. The player must take some risks to win because the player might get trapped while getting a point.

21. Give the following rule:

    Rule 4: Make the player visit almost every square.

22. Emphasize the following concept for Rule 4:

    It is important to make the player do as much as possible. Visiting nearly every square will give the player a longer and fuller game experience.

III. Practice 2: Using a Collection Mechanic and Indirect Control (Time: 5 – 8 Minutes)

1. Ask the student to turn to page 22 for Practice 2.

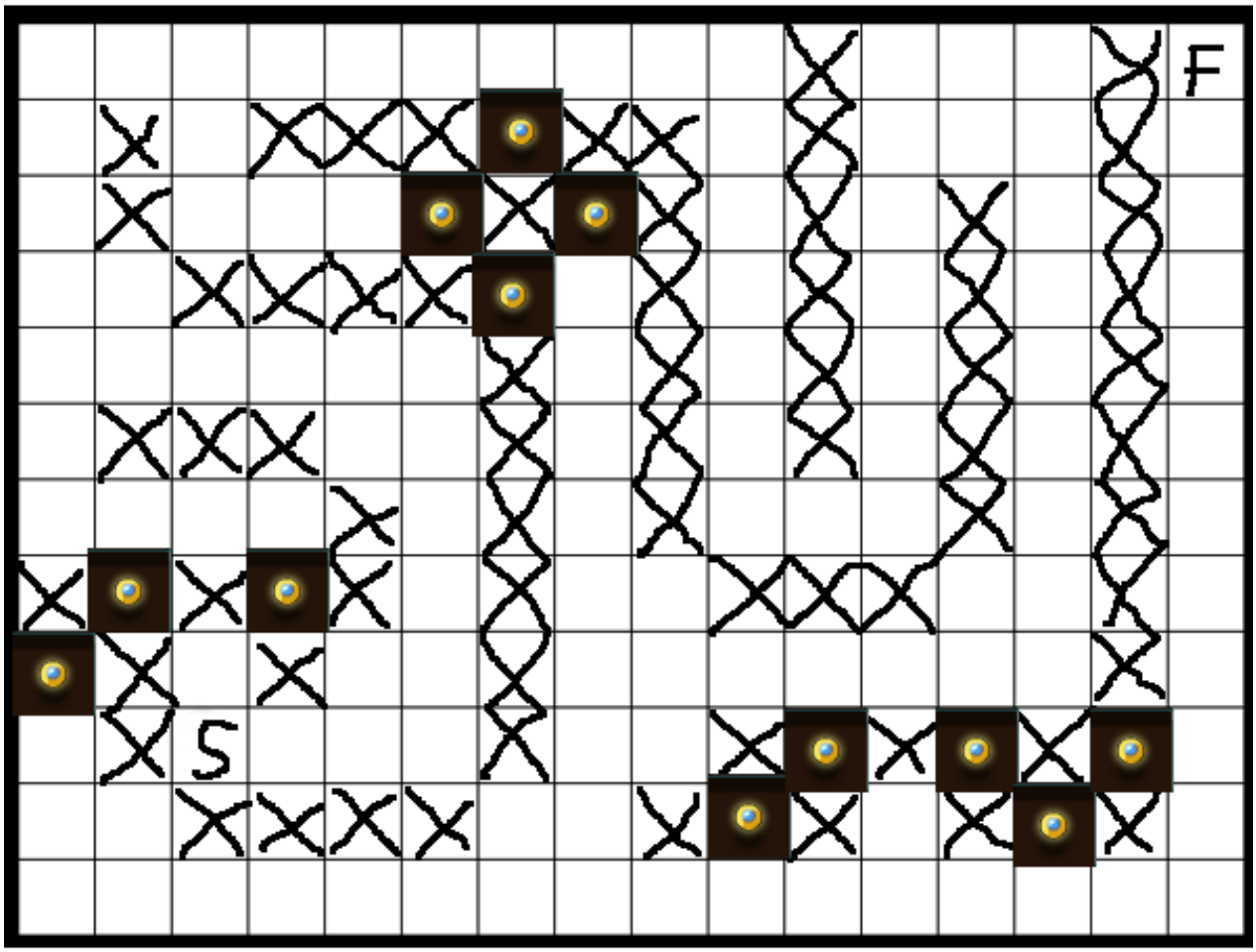
2. Tell the students they will be putting points in their games and using indirect control using the following rules:
   1. Use at least four points.
   2. Four points must be at least 10 squares (along a path) from each other.
   3. Use indirect control to influence strategy.
   4. Make the player visit almost every square.

3. Tell the students that, as they add points, they may change their previous design, but they must follow the previous rules if they make changes.

4. Ask the students to look at Example 16.

5. Tell the students to add at least four points to their game board using paper tokens. Remind them to use the rules. When finished, the board should look something like Example 16.

Example 16. Adding points to the design. (Student manual page 22)

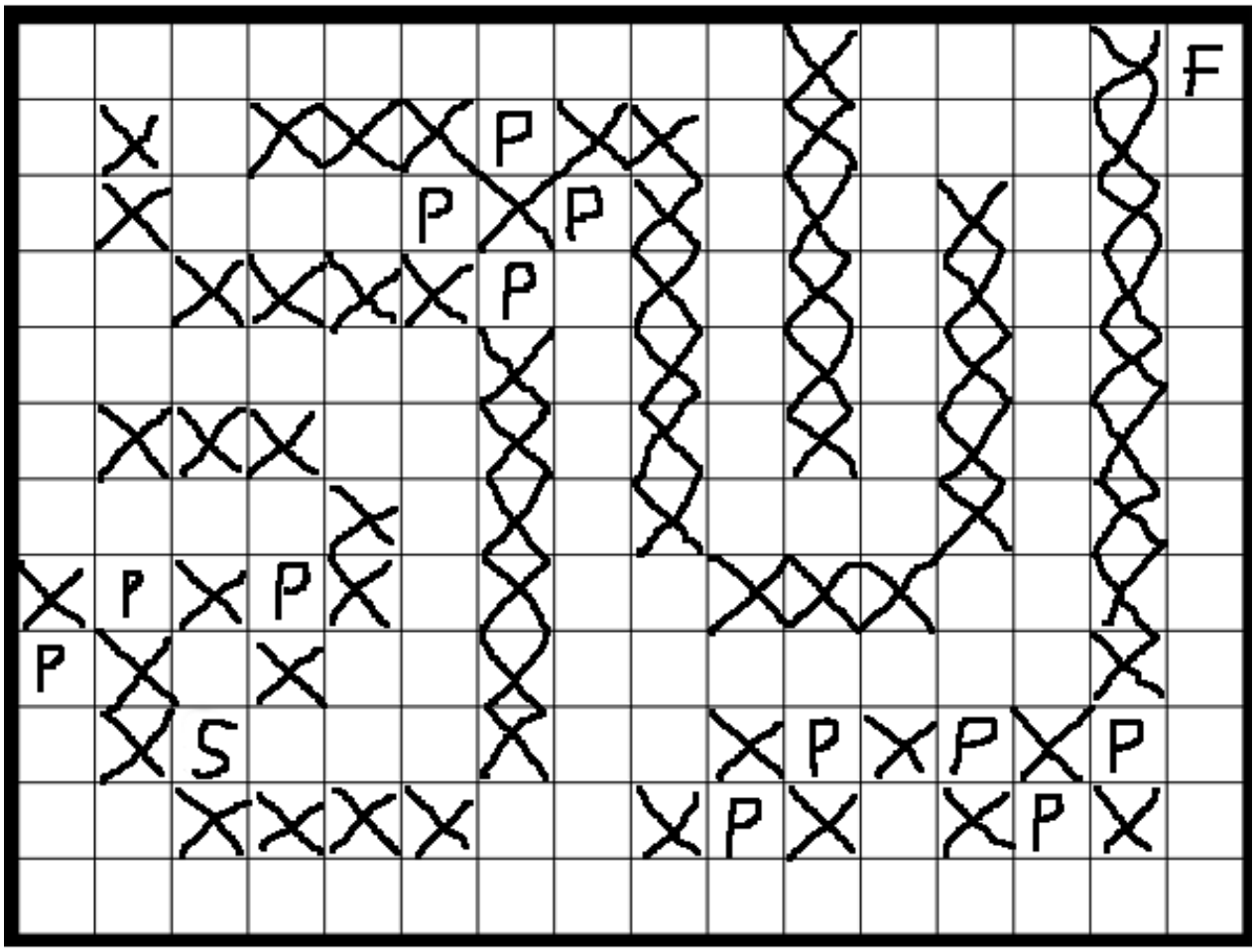


7. Ask the students to turn to page 23 for Example 17.

8. Tell the students to put a “P” in the square for each point on their game board.

9. Tell them it should look something like Example 17.

Example 17. Recording the location of the points. (Student manual page 25)




10. Tell the students to look at the checklist on page 23. They should now review their boards and go through the checklist to see if all of the rules have been followed. If not, they should correct their designs.

11. Walk around the room and help students as necessary.

12. If a student is having serious difficulty and cannot catch up. You may want to provide the student with the pre-made Step 2 board that is provided in the appendix.

**Step 3: Using Traps**

I. Introduction

1. Ask the students to turn to page 24, Step 3: Using Traps.
2. Tell the students that one way to challenge the player is to use traps.
3. Tell them that traps will be represented by red blocks in their games, and, for the board game design, dice will be used to decide whether a player touches a red block.
4. Explain that any squares around a red block (even diagonally) make up a "danger zone."
5. Introduce the following group of rules. Explain that a group of rules is needed to determine how:
    a. A player moves through the game.
    b. A player receives damage.
    c. A player loses or wins the game.

Rules for Player Motion

1. The player rolls one die and moves the number of squares on top of the die.
2. The player can't go backwards during a turn unless the player reaches a dead end.
3. If the player lands in a danger zone (next to a red square), the player must roll for damage.
4. If the damage roll is equal to or less than the number of red blocks in the danger zone, the player takes 1 point of damage.
5. If the player receives 3 damage points, the player loses.
6. (Optional) Timer: You may limit the number of rolls that the player can make. For example, if the player does not collect all the points and reach the finish by twenty rolls, the player loses.

6. Introduce the concept of game balance:

    If these rules are followed, the player can lose. As a designer, it is important that the game is fair. Players can either win or lose and the game is neither to easy (boring) or frustrating. The game must be balanced to be fun.

7. Give the following definition:

    *Balance*: The sense of fairness in a game. A game should not be too easy or too hard.

8. Emphasize the following concept about achieving balance:

    Balance can only be achieved by "play testing" the game design several times.

II. Rules and Examples

1. Give the students the following rule;

   Rule 1: Use no more than 25 red blocks.

2. Emphasize the following for Rule 1:

   The game should not be too difficult. If there are too many red blocks, the player will always lose.

3. Give the following rule:

   Rule 2: Do not put more than 3 red blocks in a danger zone.

4. Give this explanation:

   An empty square is in a danger zone if it has at least one red block next to it. The red block can be diagonal to the square.

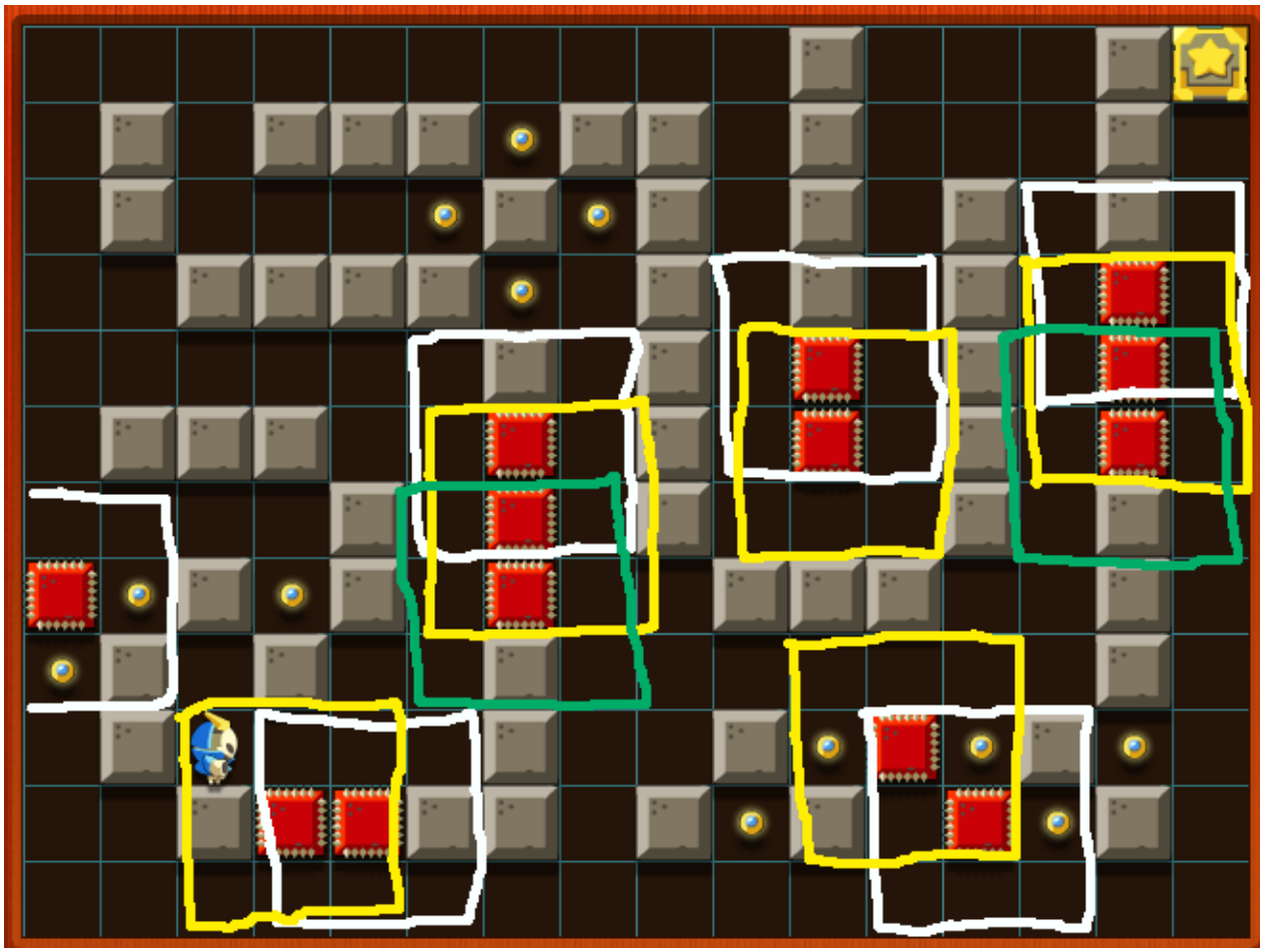
5. Emphasize this concept for Rule 2:

   If there are more than 3 red blocks in a danger zone, then the chance of the player receiving damage is greater than 50%. That's a high percentage, and it would be likely that the player would receive damage.

6. Ask the students to turn to page 25 to discuss Example 18.

7. Explain that the area in each color square is a danger zone.

Example 18. Adding danger zones. (Student manual page 25)



8. Give the following rule:

   Rule 3: Do not have more than 5 separate danger zones next to each other.

9. Emphasize the following ideas for Rule 3:

   The purpose of this rule is similar to the previous rule. If there are many danger zones next to each other, the chances that the player will receive damage increases. To balance the game, there must be a good combination of danger zones and safe squares. A good combination can only be confirmed through play testing.

10. Ask this question: Does Example 18 follow Rule 3?

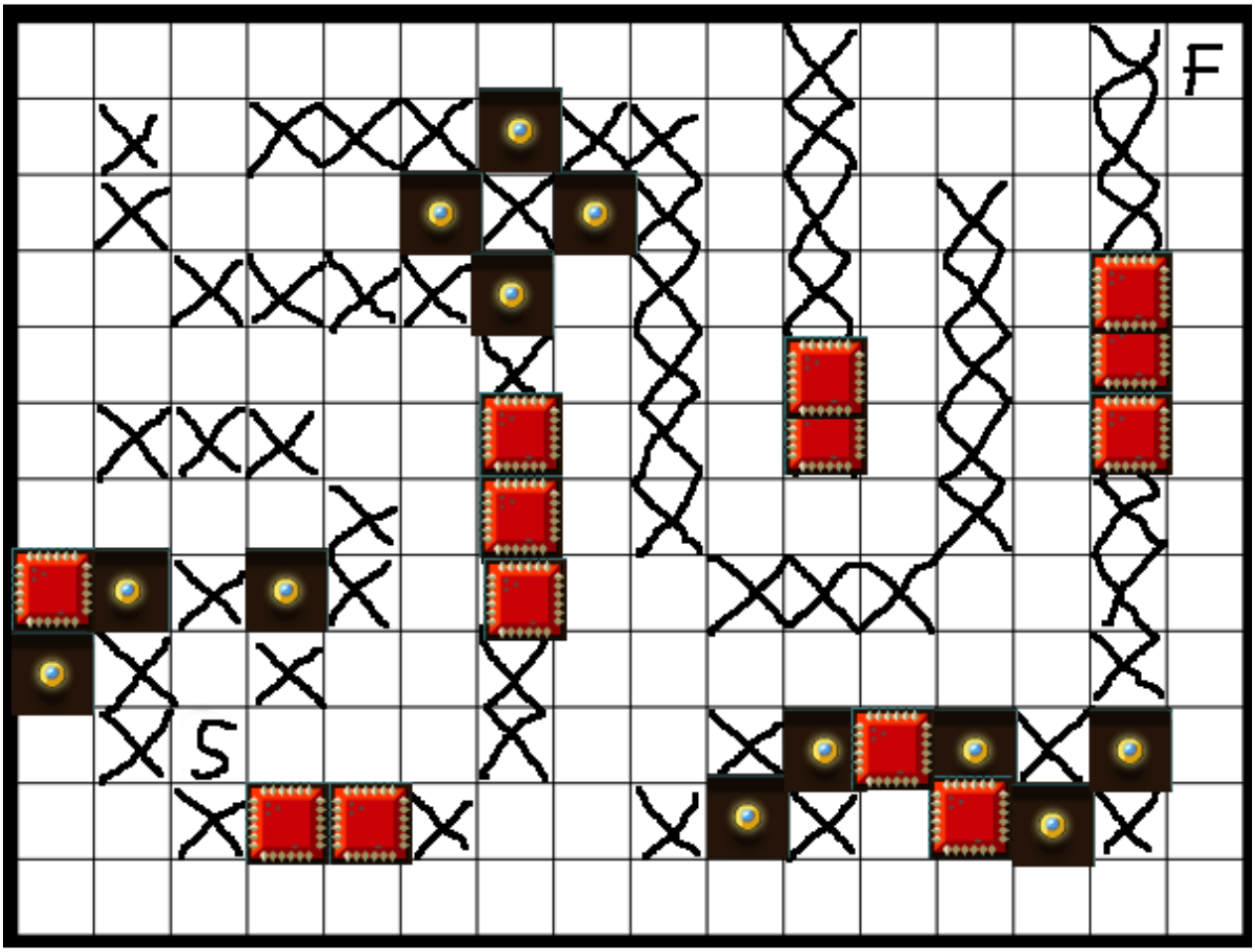
    Answer: Yes, there is no chain of five or more danger zones.

11. Before proceeding to Practice 3, emphasize that game design is design for OTHER people—not yourself. Balancing a game is crucially important. A game can only be good if other people enjoy it.

III. Practice 3 (Time: 12 - 17 Minutes)

1. Ask the students to turn to page 26 for Practice 3.
2. Tell the students they will add traps (red blocks) to their games using the following rules:
    1. Use no more than 25 red blocks.
    2. Do not put more than 3 red blocks in a danger zone.
    3. Do not have more than 5 separate danger zones next to each other.
3. Tell the students that, as they add red blocks, they may change their previous design, but they must still follow the previous rules if they make changes.
4. Ask the students to turn to page 27, Example 19
5. Tell the students to put red blocks in their game using paper tokens. Their board will look something like Example 19

Example 19. Adding red blocks. (Student manual page 27)

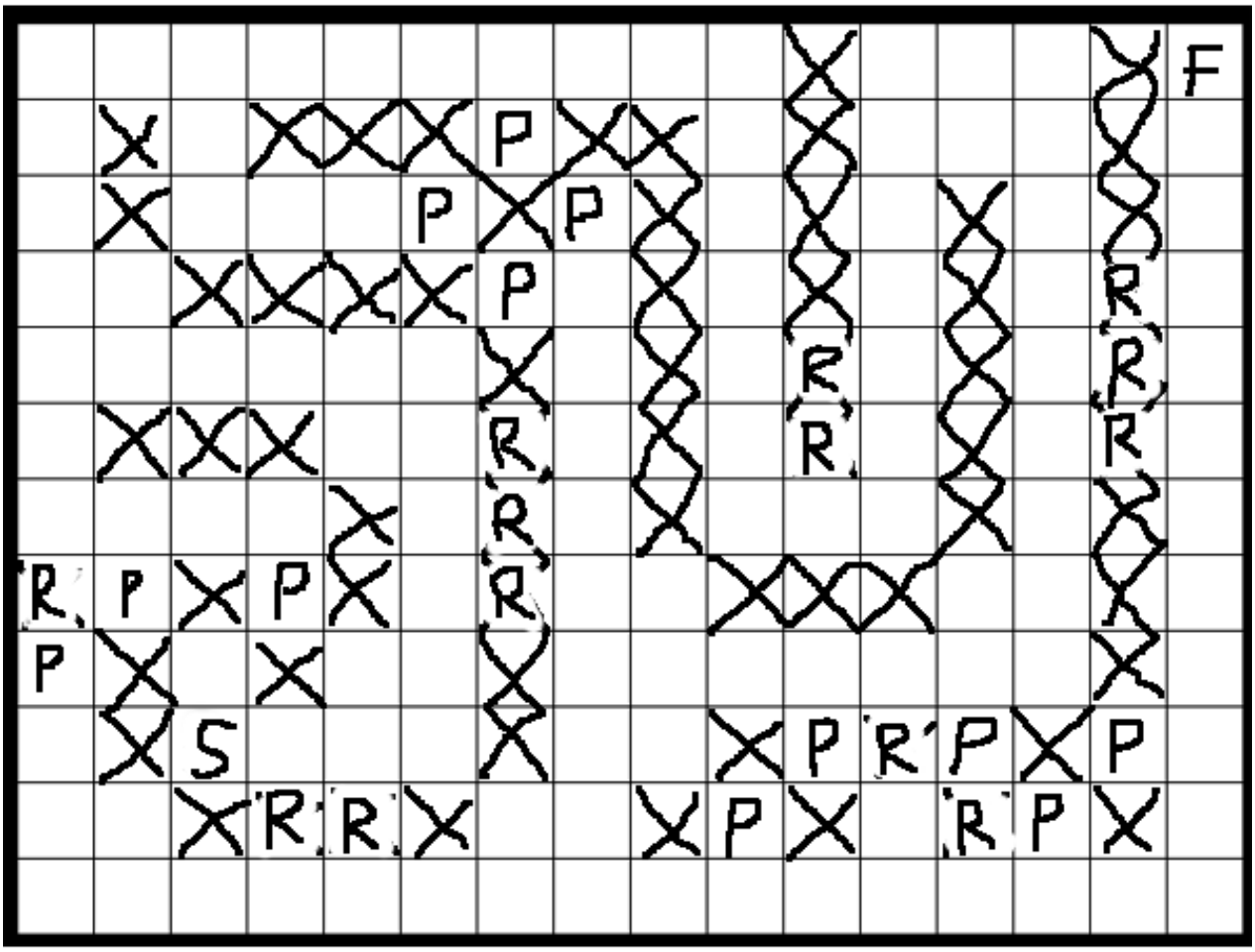


6. Have the students play their games.

7. Ask the students to turn to page 28, Example 20.

8. Tell the students to put an “R” in each square with a red block. Their board should look something like Example 20.

Example 20. Recording the red blocks.




9. (Optional) Tell the students that, if they use a timer, they should note the maximum number of rolls that a player can have on the game board sheet.

10. Tell the students to look at the checklist on page 28. They should now review their boards and go through the checklist to see if all of the rules have been followed. If not, they should correct their designs.

11. Walk around the room and help students as necessary.

12. If a student is having serious difficulty and cannot catch up. You may want to provide the student with the pre-made Step 4 board that is provided in the appendix.

13. Encourage the students to play their designs at least twice. They may need time to make some adjustments to their designs after playing them.

14. Time permitting, each student should have another student play the game. Encourage the students to ask the following questions:
    a. Where does the player have problems?
    b. Does the player lose all the time?
    c. If the player loses, is it close?

15. Here are the rules for player motion, damage, and lose/win conditions again for your reference.

1. The player rolls one die and moves the number of squares on top of the die.
2. The player can't go backwards during a turn unless the player reaches a dead end.
3. If the player lands in a danger zone (next to a red square), the player must roll for damage.
4. If the damage roll is equal to or less than the number of red blocks in the danger zone, the Player takes 1 point of damage.
5. If the player receives 3 damage points, the player loses.
6. (Optional) Timer: You may limit the number of rolls that the player can make. For example, if the player does not collect all the points and reach the finish by twenty rolls, the player loses.

**Step 4: Using Enemies (Optional)**

I. Introduction

1. Ask the students to turn to page 29, Step 4: Using Enemies.

2. Tell the students that enemies are another way to add excitement to a game.

3. Tell the students that new rules will be added to use enemies.

4. Review the following rules:

Rules for Enemies

1. The player moves and receives damage as before.
2. After the player moves and rolls for damage (if necessary), roll the die for the enemies.
3. Move each enemy the number of squares equal to the number on top of the die.
4. Enemies can only move back and forth. When they reach a wall, they reverse direction.
5. If an enemy comes in contact with another enemy or the player, they pass through each other.
6. If the player lands on an enemy or the enemy lands on a player, the player receives one point of damage.

II. Rules and Examples

1. Give the following rule:

   Rule 1: Use no more than 10 enemies.

2. Emphasize this concept for Rule 1:

   Do not overload the level with enemies. Otherwise, the player will not be able to complete the level.

3. Give the following rule:

   Rule 2: Enemies should be initially spaced at least three squares apart.

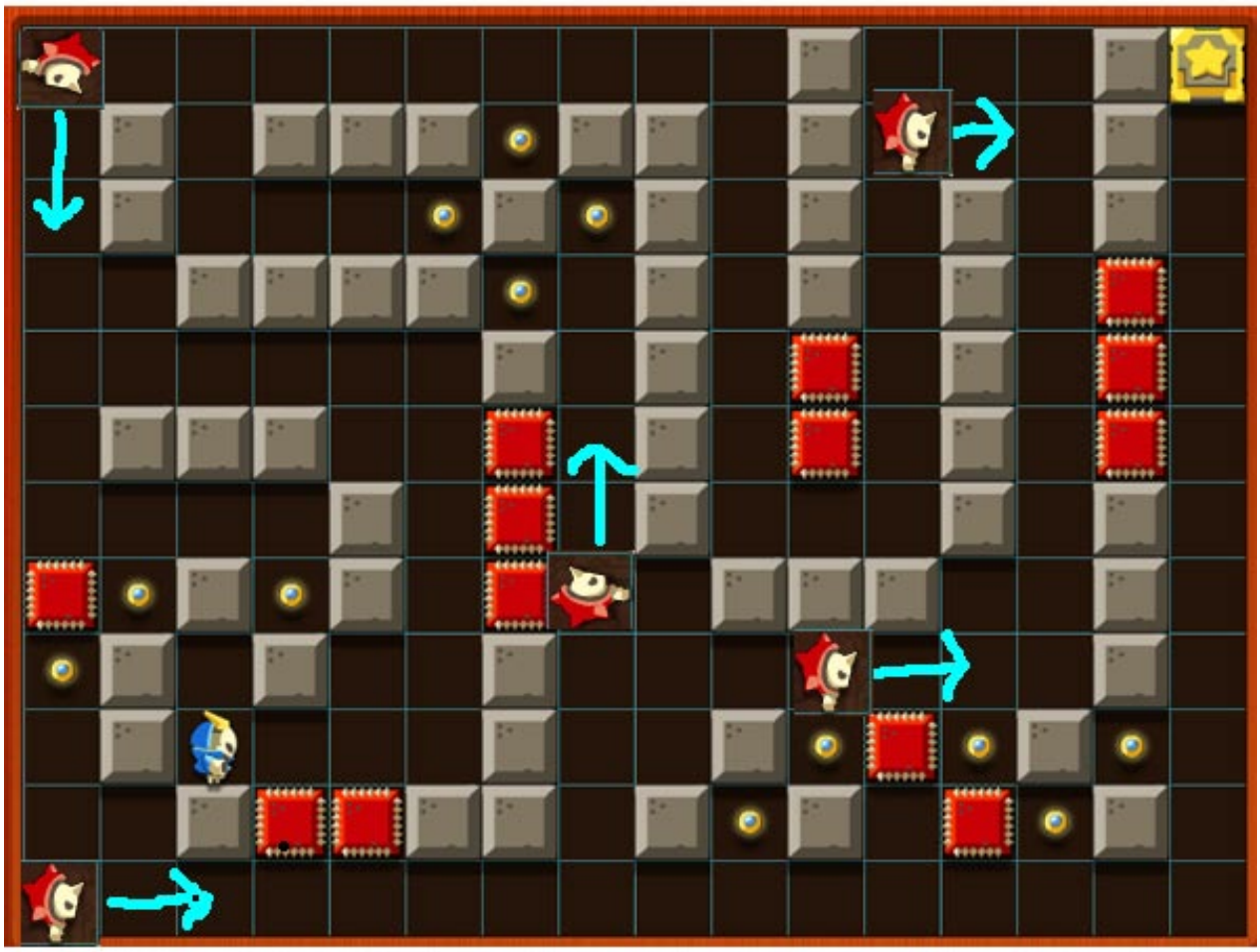
4. Explain Rule 2: as follows

   There should be some space for the player to maneuver through. The rules are designed to keep the enemies from "bunching up" too much. If necessary, change the spacing among the enemies, change the enemy start positions, or remove enemies to make more space.

5. Ask the students to turn to page 30 to discuss Example 21.

6. Explain that the red characters are enemies and the arrows indicate how the enemies move at the start of the game. Remind the students that enemies switch directions when they touch a wall (edge of the board) or block. Also, enemies pass through each other and the player if they make contact.

Example 21. Adding enemies.



III. Practice 4: Using Enemies (Time: 12 – 17 Minutes)

1. Ask the students to turn to page 30 for Practice 4.

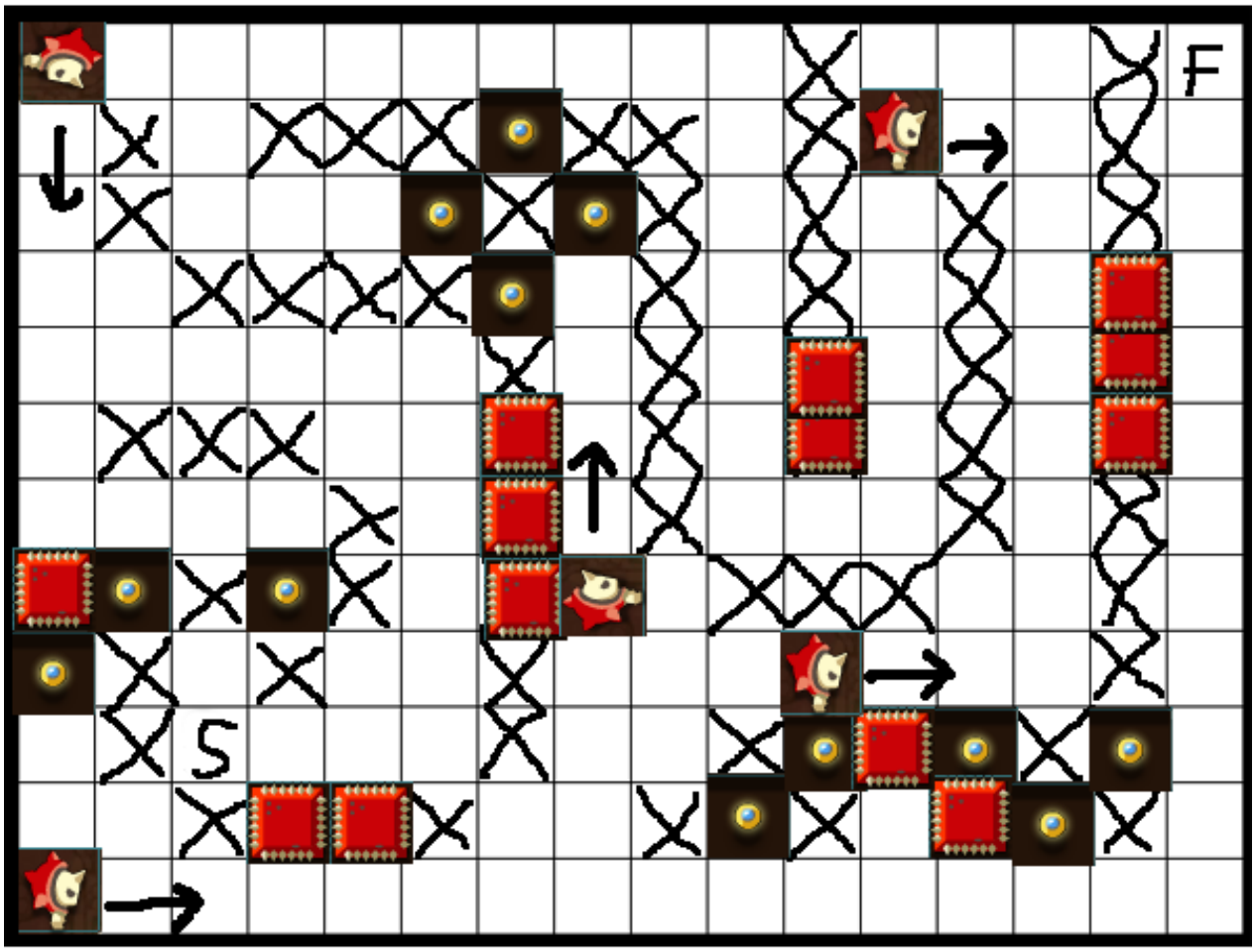
2. Tell the students that they will add enemies to their games using the following rules:
    1. Use no more than 10 enemies.
    2. Enemies should be initially spaced at least three squares apart.

3. Tell the students that, as they add enemies, they may change their previous design, but they must still follow the previous rules if they make changes.

4. Ask the students to turn to page 32, Example 22.

5. Tell the students to put enemies in their game using paper tokens. Tell them to draw an arrow showing the enemies start directions for the beginning of the game. Their board will look something like Example 22.

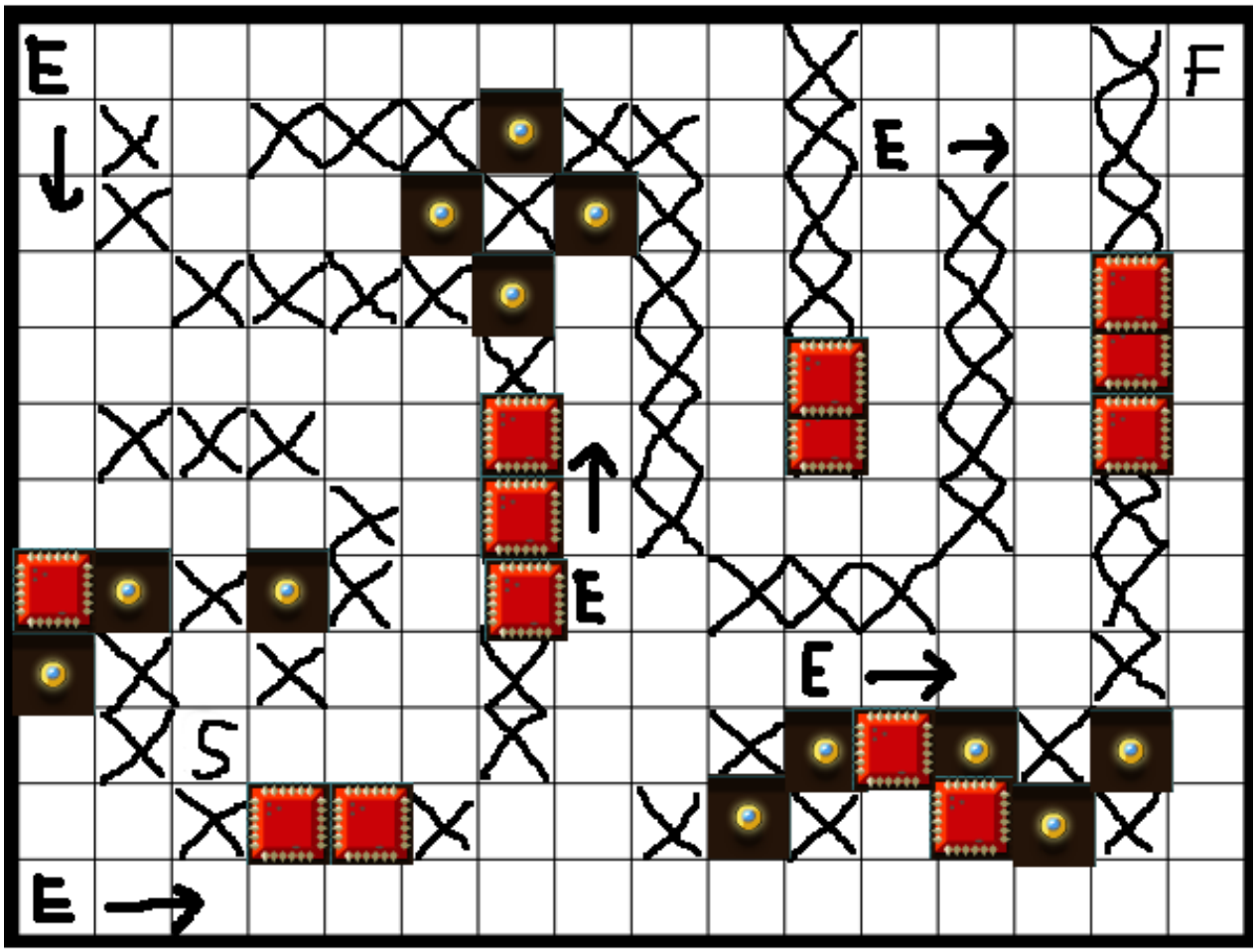
Example 22. Adding enemies. (Student manual page 32)



2. Ask the students to turn to page 33, Example 23.

3. Tell the students to mark the beginning square for each enemy with an "E." Tell them that their board should look something like Example 23.

Example 23: Recording enemy start positions.




4. (Optional) Tell the students that, if they use a timer, they should note the maximum number of rolls that a player can have on the game board sheet.

5. Tell the students to look at the checklist on page 33. They should now review their boards and go through the checklist to see if all of the rules have been followed. If not, they should correct their designs.

6. Walk around the room and help students as necessary.

7. Encourage the students to play their designs at least twice. They may need time to make some adjustments to their designs after playing them.

8. Time permitting, each student should have another student play the game. Encourage the students to ask the following questions:
    a. Where does the player have problems?
    b. Does the player lose all the time?
    c. If the player loses, is it close?

9. Here are the rules for player enemies again for your reference.

<u>Rules for Enemies</u>

1. The player moves and receives damage as before.
2. After the player moves and rolls for damage (if necessary), roll the die for the enemies.
3. Move each enemy the number of squares equal to the number on top of the die.
4. Enemies can only move back and forth. When they reach a wall, they reverse direction.
5. If an enemy comes in contact with another enemy or the player, they pass through each other.
6. If the player lands on an enemy or the enemy lands on a player, the player receives one point of damage.

**Review**

Ask the students to turn to page 34, Review.

Review the following rules and answer any questions before giving the assessment.

Rules for Spaces

1. The player must be able to complete the level.
2. The level should use all the available space.
3. The level from goal to finish has at least four bends and is at least 10 squares long.
4. The level should have at least three dead ends, loops, or both.

Rules for Collection Mechanics and Indirect Control

1. Use at least four points.
2. Four dots must be at least 10 squares (via a path) from each other.
3. Use indirect control to influence strategy.
4. Make the player visit almost every square.

Rules for Traps

1. Use no more than 20 red blocks.
2. Do not put more than 3 red blocks in a danger zone.
3. Do not have more than 5 danger zones containing 3 red blocks next to each other.

Rules for Enemies (Optional)

1. Use no more than 10 enemies.
2. Enemies should be initially spaced at least three squares apart.

**Let's Play Again (Assessment)**

1. Provide each student with at least two blank game boards.
2. Ask the students to turn to page36, Let's Play Again.
3. Have the students make a new game using the rules as listed in the review.
4. They are provided with a summary of the procedure ("Tips" in the student manual). The procedure is listed below for your reference.

**Tips Summary**

1. Draw a path from "S" to "F" using the rules.
2. Add dead ends, loops, or both.
3. Fill in where the blocks will be. You can use X's or shade them.
4. Redraw without the lines going along the path.
5. Put points in the game using paper tokens.
6. Put a "P" in the square of each point.
7. Put red blocks in using paper tokens.
8. Mark the location of each red block with an "R."
9. Add enemies using paper tokens. Draw an arrow showing their start directions. Here's an example:
10. Mark the location of each enemy with an "E."
11. If you use a timer, be sure to note the maximum number of rolls that a player can have.

**A Final Checklist**

Ask the students to turn to page 37, A Final Checklist. Encourage the students to use this checklist to ensure that they are using the design rules.

This is the checklist to assess the student's final game. Each question is worth one point. The first four sections correspond to the four steps. The last question in Balance Checklist is harder to verify and may be an optional or bonus assessment item since it may require playing the student's game many times to verify. Ideally, the student's game should be played at least twice to check the balance.

See the appendix for a checklist master sheet that may be copied for each student.

Space Design Checklist

1. Can the player complete the level? Yes _____ No _____
2. Is all the available space used? Yes _____ No _____
3. Are there at least four bends from start to goal? Yes _____ No _____
4. Is the path from start to goal at least 10 squares long? Yes _____ No _____
5. Are there at least three dead ends, loops, or both? Yes _____ No _____

Collection Mechanic Checklist

1. Are there at least four dots? Yes _____ No _____
2. Are there Four dots that are at least 10 squares from each other> Yes _____ No _____
3. Is there indirect control to influence strategy? Yes _____ No _____
4. Does the player have to visit almost every square? Yes _____ No _____

Trap Checklist

1. Is there no more than 20 red blocks? Yes _____ No _____
2. Do all danger zones have 1, 2, or 3 red blocks? Yes _____ No _____
3. If danger zones are in a row, are there no more than 5 in the row? Yes _____ No _____

Enemies Checklist (Optional)

1. Are there no more than 10 enemies? Yes _____ No _____
2. Are enemies at least three squares apart at the beginning? Yes _____ No _____

Balance Checklist

1. Is it possible to win the game? Yes _____ No _____
2. Is it possible to lose the game? Yes _____ No _____

**Level Up!**

If you would like to teach more units on game design, here are some ideas for further development:

1. Have the students make new tokens with new effects. For example, a health pack token can be used to add "lives" to the player.

2. The students can adjust and make new rules for player motion.

3. The students can make new rules for red blocks and player damage. For example, they can experiment with allowing up to seven red blocks in a danger zone with a roll of six always being safe. Balancing the game will be a challenge.

4. The students can adjust and make new rules for how enemies move. For example, instead of going back and forth, an enemy can turn right every time it has the opportunity to turn. Also, enemies could move randomly. Rolling a die can determine how the enemy moves (1 means turn left, 2 means turn right, 3 means forward, 4 means backward, 5 and 6 mean stop).

5. The students can experiment with time limits. The player can only roll the dice a maximum number of times. If the player has not finished by the maximum limit, the player loses.

6. The students can play their designs as multiplayer board games. Each enemy can be played by a different player. There are many possibilities for development. For example, there could be teams of players trying to capture as many points as possible. There are many rules to consider. Can a player be taken out of a game? Should a player be sent back to a start square if another player lands on his or her token? How can points be captured?

Encourage your students to explore their own idea, and remind your students to always test their designs and have other people play their games. One of the most important concepts for them to understand is that game design is about designing for other people—not for oneself. The more designs they make and play, the better their game design skills will be.

**Appendix**

**References**

Fullerton, T., Swain, C., & Hoffman, S. (2004). *Game Design Workshop: Designing, Prototyping, and Playtesting Games.* New York: CMP Books.

Salen, K., & Zimmerman, E. (2004). *Rules of Play: Game Design Fundamentals.* New York: MIT Press.

Schell, J. (2008). *The Art of Game Design: A Book of Lenses.* Boston: Morgan Kaufmann Publishers.

**Video Game**

*GamestarMechanic*. (In development). New York: Gamelab.

You can find *GamestarMechanic* at www.gamestarmechanic.com.

**Glossary**

Balance: The sense of fairness in a game.

Collection Mechanic: A game mechanic in which the player must collect objects.

Game Mechanic: An action that a player does over and over again during a game.

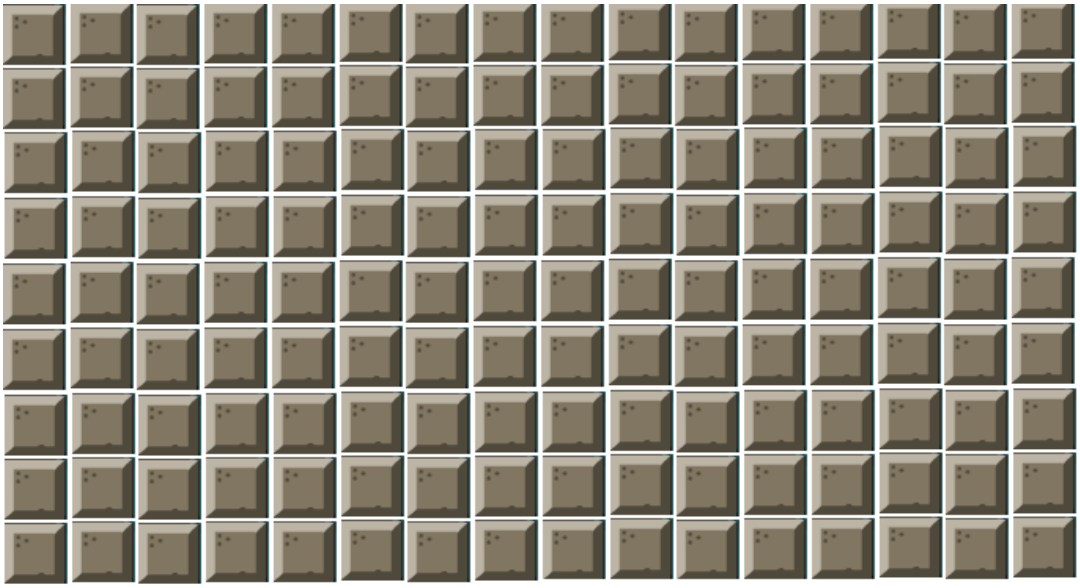
Game Space: The physical or virtual game space in which someone plays a game.

Indirect Control: When the game designer controls the player's choices without the player knowing it. This is usually done by setting goals for the player and using visual cues.

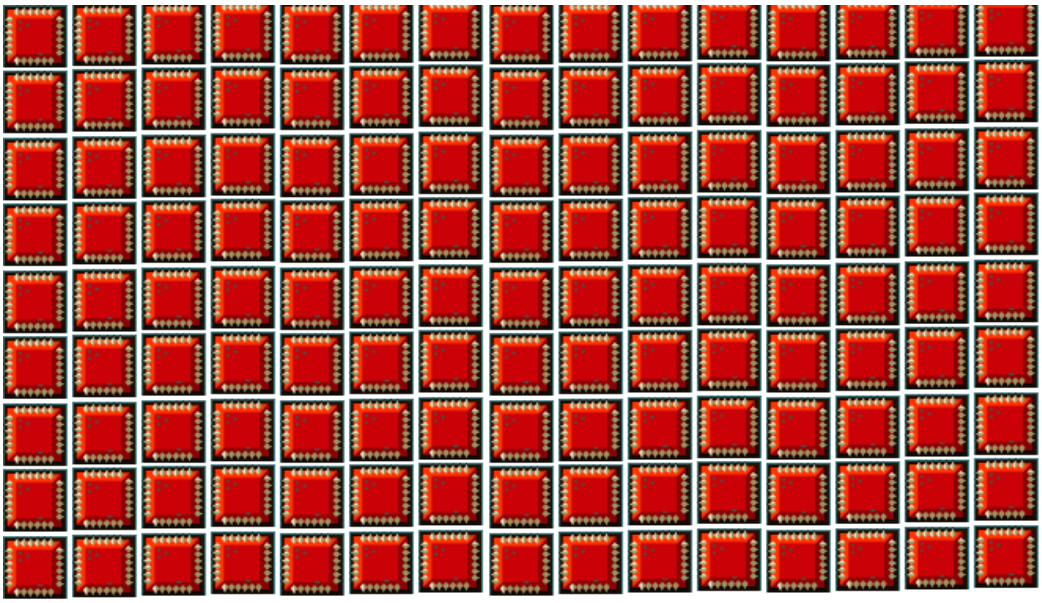
Paper prototype: A preliminary design done in paper form to see if a design works.

**Token Sheets**

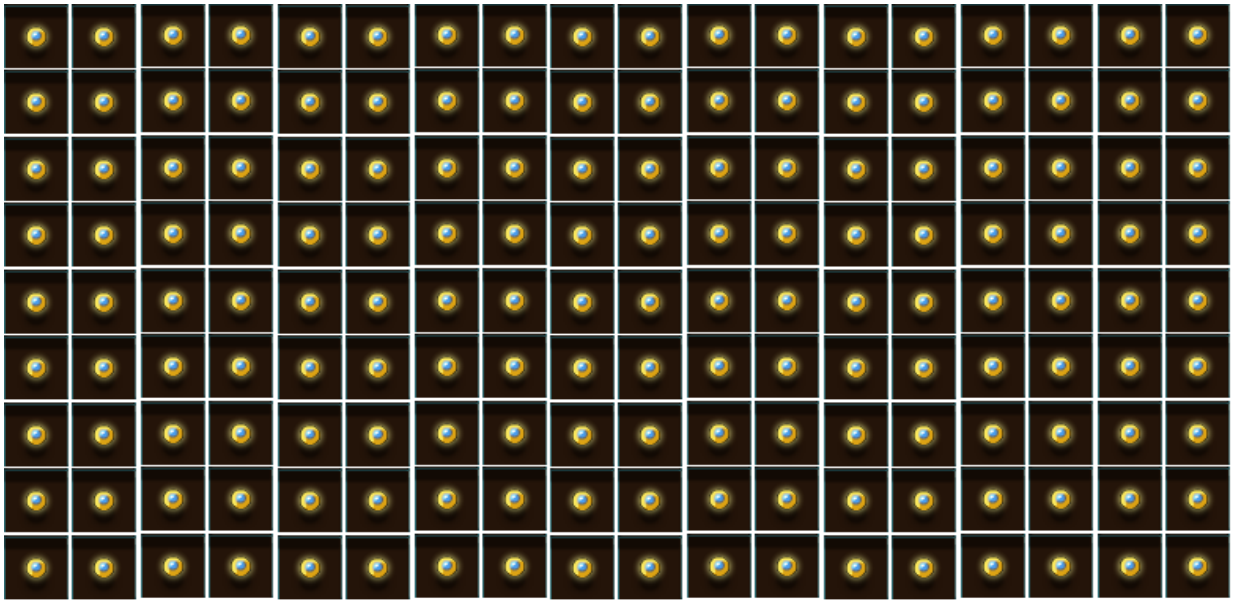
Blocks:



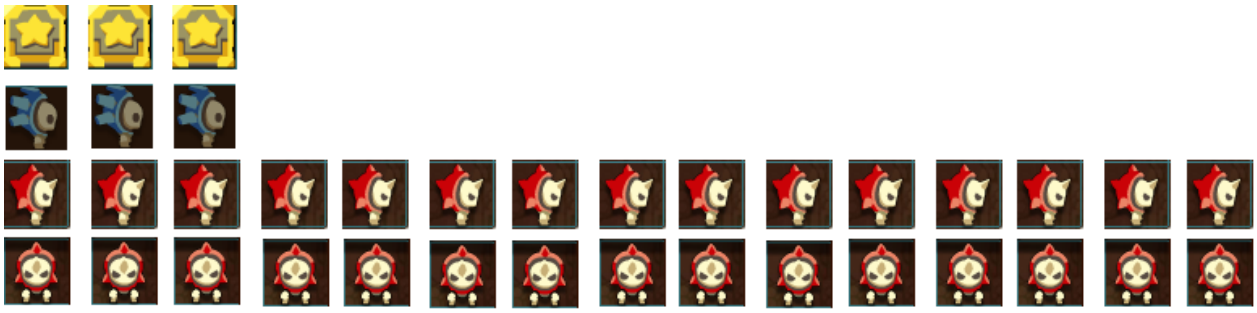
Red Blocks:



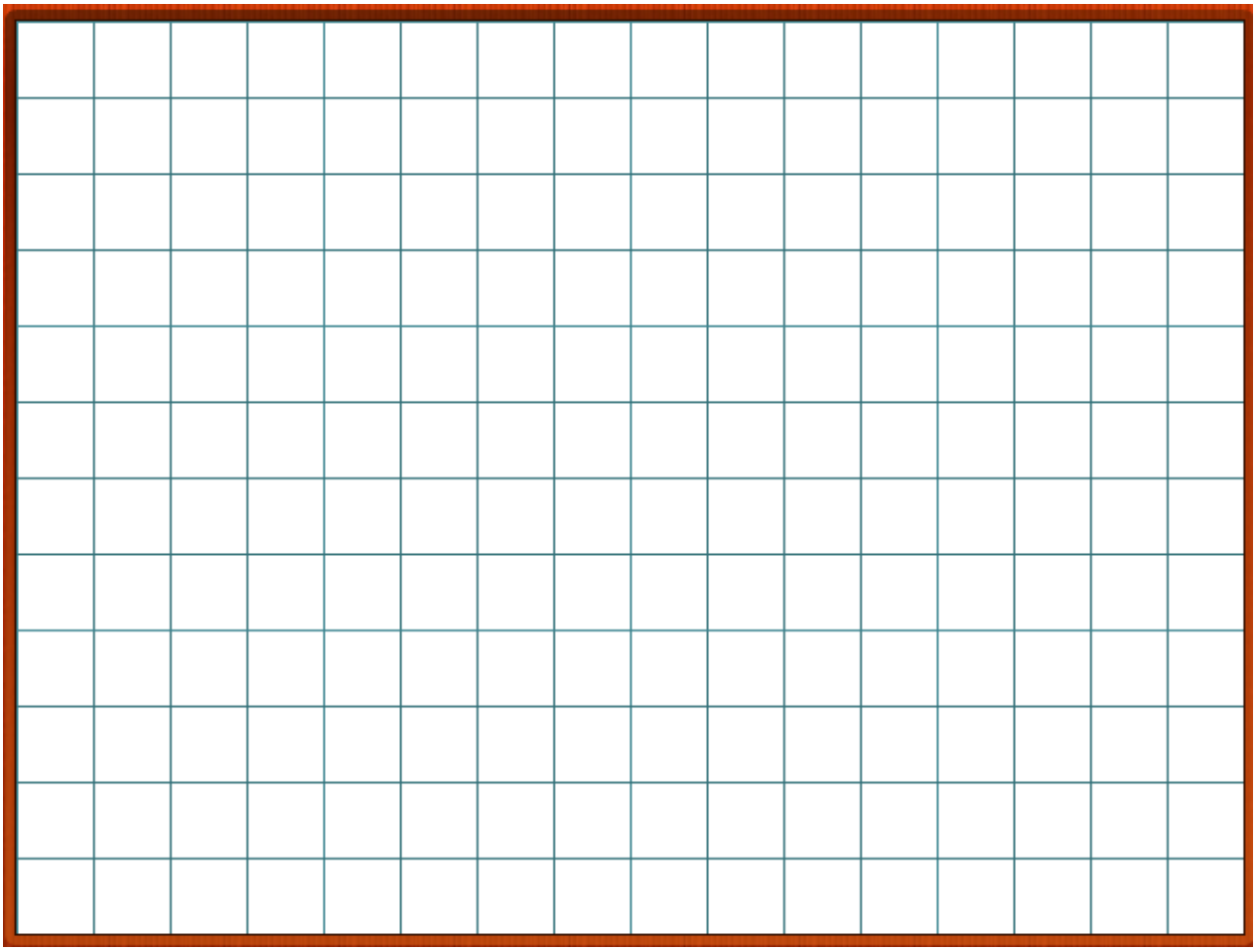
Points:



Player, Enemy, and Finish Tokens:



**Blank Game Board**



**Game Design Checklist**

Name:

Space Design Checklist

1. Can the player complete the level? Yes _____ No _____
2. Is all the available space used? Yes _____ No _____
3. Are there at least four bends from start to goal? Yes _____ No _____
4. Is the path from start to goal at least 10 squares long? Yes _____ No _____
5. Are there at least three dead ends, loops, or both? Yes _____ No _____

Collection Mechanic Checklist

1. Are there at least four dots? Yes _____ No _____
2. Are there Four dots that are at least 10 squares from each other> Yes _____ No _____
3. Is there indirect control to influence strategy? Yes _____ No _____
4. Does the player have to visit almost every square? Yes _____ No _____

Trap Checklist

1. Is there no more than 20 red blocks? Yes _____ No _____
2. Do all danger zones have 1, 2, or 3 red blocks? Yes _____ No _____
3. If danger zones are in a row, are there no more than 5 in the row? Yes _____ No _____

Enemies Checklist (Optional)

1. Are there no more than 10 enemies? Yes _____ No _____
2. Are enemies at least three squares apart at the beginning? Yes _____ No _____

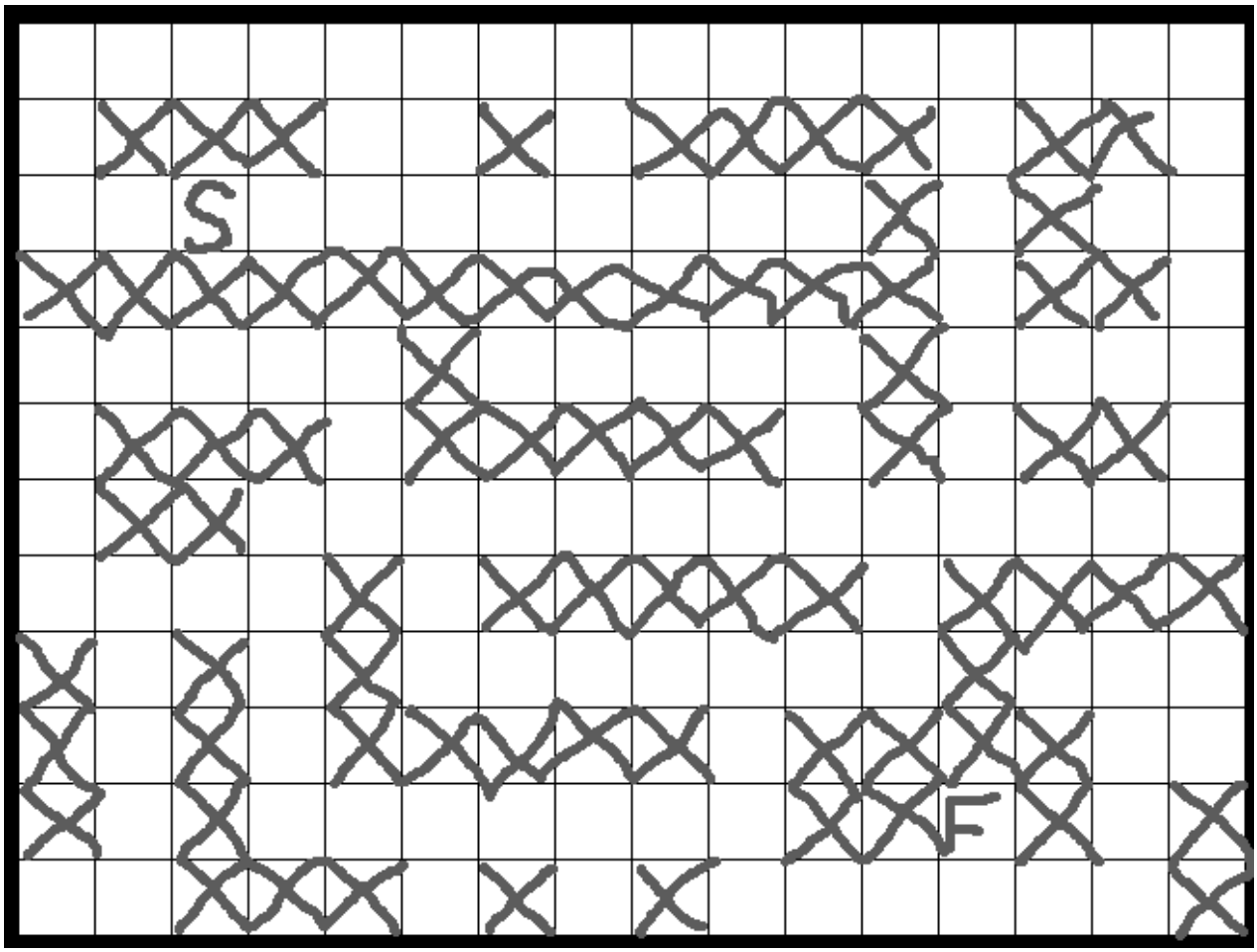
Balance Checklist

1. Is it possible to win the game? Yes _____ No _____
2. Is it possible to lose the game? Yes _____ No _____

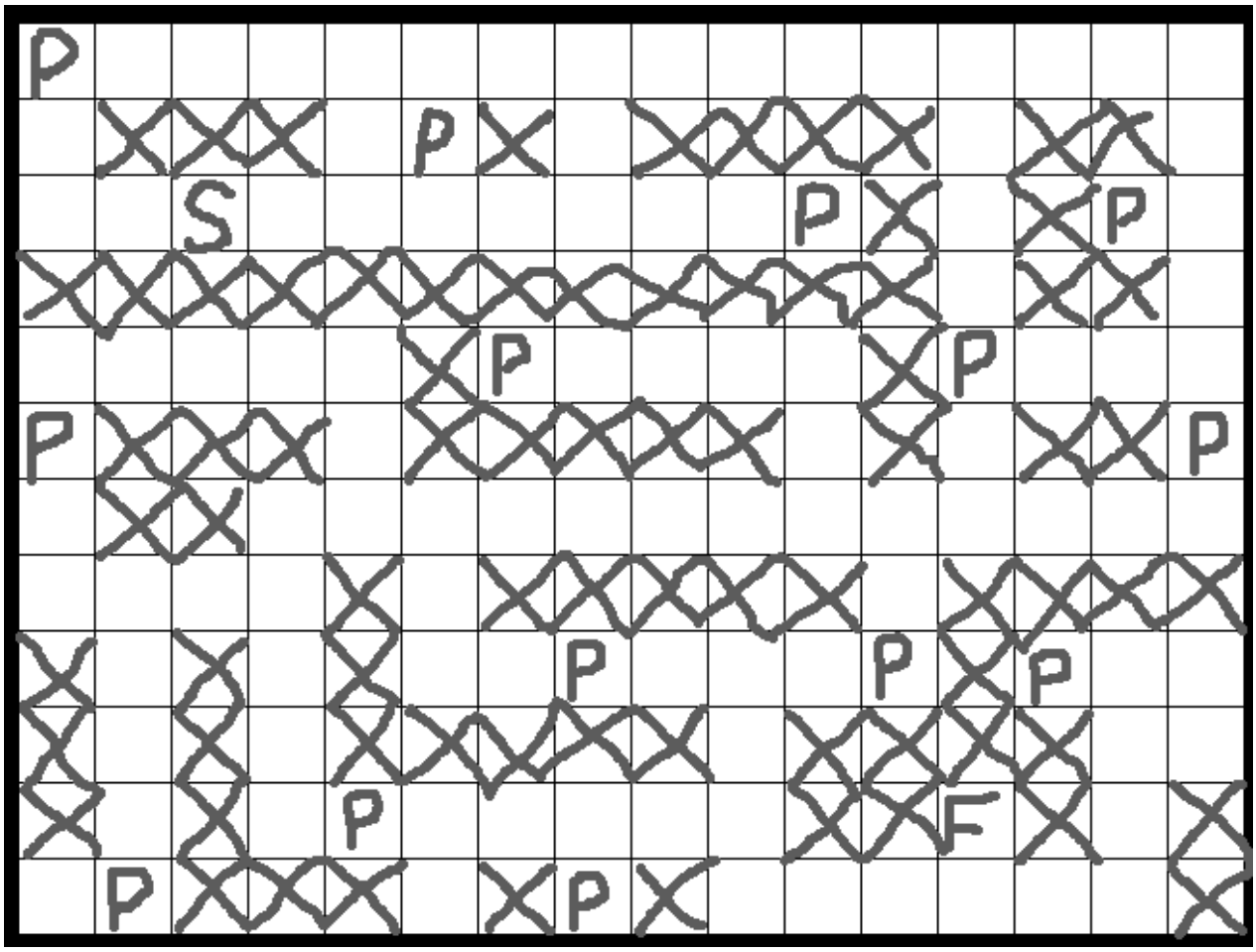
Total Points _____

Comments:

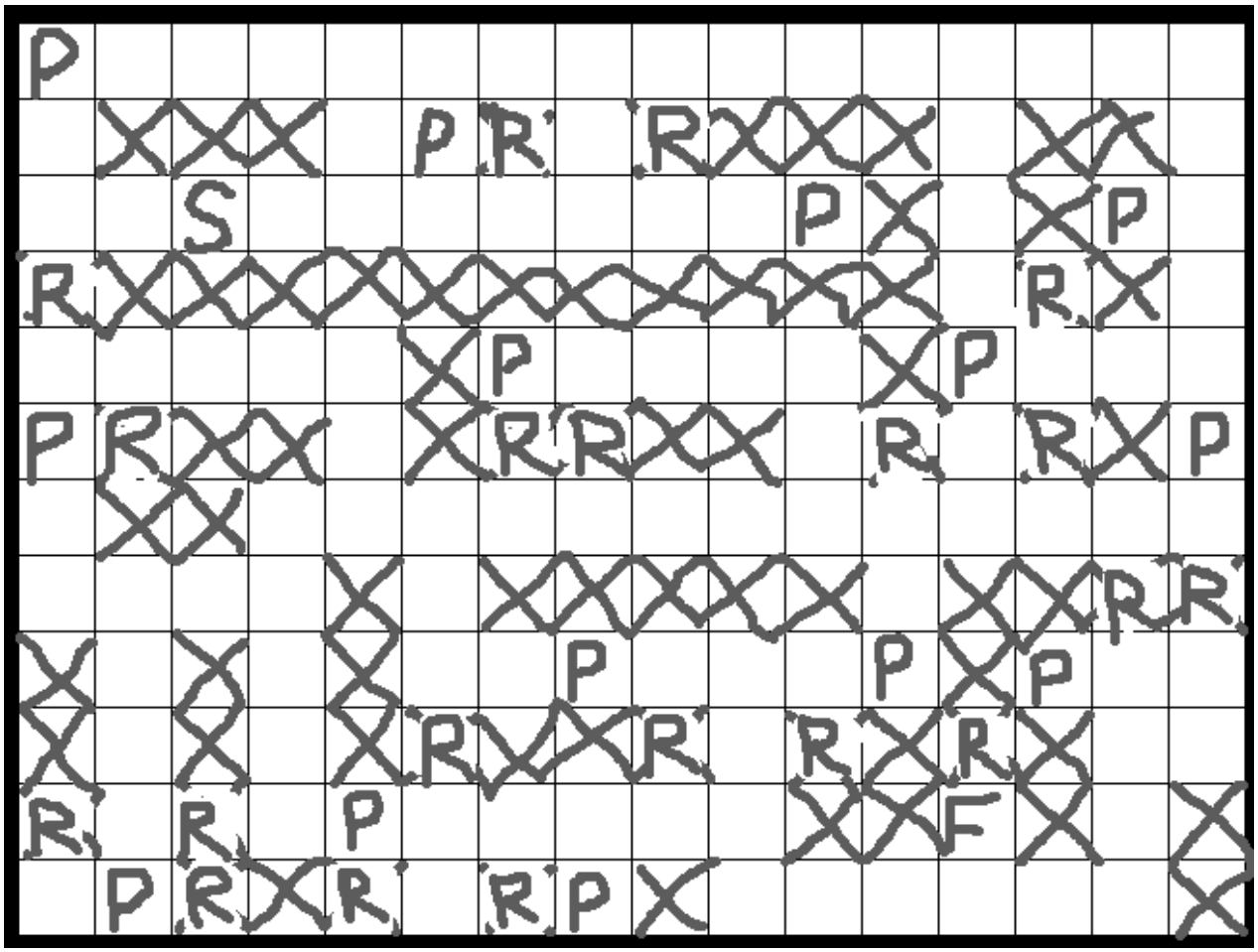
A Solution For Step One



A Solution for Step Two



A Solution for Step Three



A Solution for Step Four