

Program Planning

Textbook

Program Planning



Planning the Perfect Adventure

Alexandra and Joey were in the computer lab starting their new coding project.

"Let's make a racing game!" Alexandra suggested. "The cars can go fast, slow down, and maybe jump over obstacles!"

Joey asked, "How do we make sure the race works without any problems?"

Alexandra replied, "We need to plan the game first. We should figure out what happens in the game, step by step."

Joey looked at his screen. "What's the first step?"

"First," Alexandra said, "we need to decide the sequence of events. For example, the cars should start at the starting line, speed up, slow down at curves, and jump over ramps."

Joey understood. "So we need to write down what happens first, second, and last?"

"Exactly!" Alexandra said. "Then we set a goal for the game. Maybe the goal is for the car to finish the race without crashing. That's our expected outcome!"

Joey said, "Planning helps us know what the cars need to do, and in what order."

Alexandra agreed. "Once we've planned everything out, we can start building the game!"

What Is Program Planning?

Program planning means deciding what your program will do before you start coding. It includes:

- **Sequence of events:** What happens first, next, and last

- **Goal:** What you want the program to achieve
- **Expected outcome:** What should happen when it works correctly
- **Resources needed:** Which sprites and backgrounds to use

Why Plan Before Coding?

Planning helps:

- Organize your ideas clearly
- Avoid confusion while coding
- Save time by preventing mistakes
- Make debugging easier
- Create better programs

Steps for Program Planning

1. Choose your goal

- What do you want to create?
- What should it do?
- Who will use it?

2. List the main events

- Beginning: How does it start?
- Middle: What happens?
- End: How does it finish?

3. Select resources

- Which sprites do you need?
- What backgrounds fit your story?
- What sounds will you use?

4. Create a sequence

- Number each step
- Put them in order
- Check the logic

Planning Tools

Use these to organize:

- **Step lists:** Write steps 1, 2, 3...
- **Storyboards:** Draw simple pictures
- **Flowcharts:** Use arrows to show flow
- **Planning sheets:** Fill in templates

Example: Planning a Space Adventure

Goal: Rocket flies to moon and returns

Sequence:

1. Rocket on Earth (earth background)
2. Countdown and launch (play woosh sound)
3. Fly through space (space background)
4. Land on moon (moon visible)
5. Return to Earth (earth background)

Resources:

- Sprites: rocket, star, moon
- Backgrounds: earth, space
- Sounds: woosh, tadah

Planning for Multiple Sprites

When using several sprites:

- List what each sprite does
- Plan their interactions
- Decide timing between actions
- Note which sprite moves when

Planning Scene Transitions

For multiple scenes:

- Scene 1: What happens?
- Transition: Go to Page block
- Scene 2: What changes?

- Continue for all scenes

Common Planning Mistakes

Avoid these problems:

- Skipping the planning phase
- Making plans too complicated
- Forgetting to plan transitions
- Not listing all resources needed
- Ignoring the program goal

Testing Your Plan

Before coding:

- Walk through each step
- Check if sequence makes sense
- Verify sprites and backgrounds exist
- Ensure goal is clear
- Ask: "Will this work?"

Revising Your Plan

Good planners:

- Review their plans
- Make changes if needed
- Simplify complex parts
- Add missing steps
- Adjust unrealistic goals

Critical Thinking Questions

1. Why is it important to plan before starting to code?
2. What problems might happen if you skip the planning step?
3. How does planning connect to creating algorithms?

Sentence Stems

- "My program plan includes (blank space)."

- "Planning helps me (blank space) because (blank space)."
- "The sequence of my program is (blank space)."

Questions (5)

1. What is a sequence of events in a program?

MULTIPLE CHOICE

Choose the correct answer:

- A. The final outcome of a program
- B. The order of steps in a program
- C. A list of characters in a program
- D. The goal of the program

2. What is the goal of a program?

MULTIPLE CHOICE

Choose the correct answer:

- A. To create more bugs
- B. To make the program difficult
- C. To achieve the result you want
- D. To make the program look pretty

3. Why is it important to plan a program before you start coding?

MULTIPLE CHOICE

Choose the correct answer:

- A. So you can write as much code as possible
- B. So you can keep adding random things to the program
- C. So you don't need to think about the program
- D. So you know what steps to take and in what order

4. What happens if you don't plan your program first?

MULTIPLE CHOICE

Choose the correct answer:

- A. The program will work better
- B. The program might not work as expected
- C. You won't have enough time to finish
- D. The program could be confusing and hard to fix

5. What is one way to help make sure your program works properly?

Choose the correct answer:

- A. Ignore the steps and try to guess
- B. Test the program only once
- C. Plan the program before you start
- D. Change the program every time something goes wrong

Games (3)

1. Program Planning Matching

Match the description to each item in program planning.

Full Screen

Audio

Instructions

Answer Key

Pause

Clear All

Check Matches

Attempts: 0

What happens first, second, last

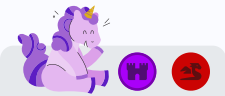
What we want to happen in the end

What the program should do when its finished

The goal

The expected outcome

The sequence of events



2. Program Planning Race Car Order

Put the steps of Alexandra and Joey's race car game in order.

Full Screen

Audio

Instructions


Answer Key

Pause


Clear All

Check Matches


Attempts: 0




The car speeds up when the light says, "Go"




The car slows down at the curve





The car crosses the finish line

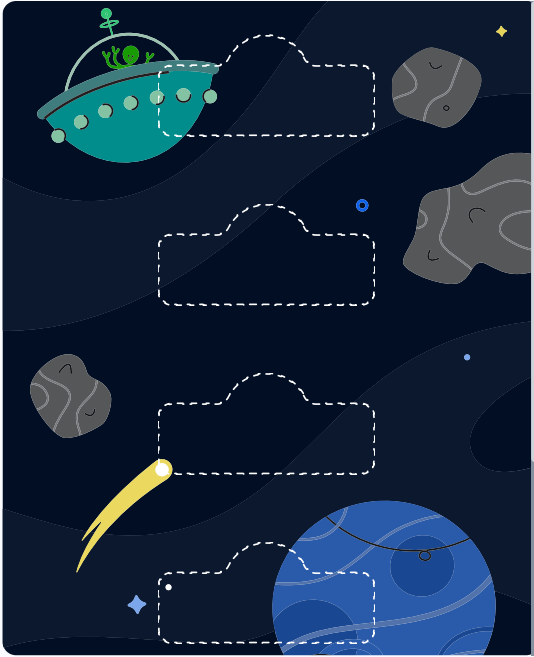


The car jumps over the ramp



The car starts at the starting line





3. Program Planning Categories

Sort the different statements into Goal, Sequence of Events, or Expected Outcome

Full Screen

Audio

Instructions

Answer Key

Pause

Clear All

Check Order

Attempts: 0

The car jumps over the ramp

The car starts at the starting line

The player finishes the race without crashing

The game ends when the player wins



You want the player to complete the game

The car slows down at the curve

Goal

Sequence of Events

Expected Outcome



Blocks Challenges (5)

1. Program Planning



Program Planning

Program a sprite to say the 3 things to think about for program planning as it moves around the scene.

1 10 3 1



Submit ↑



2. Birthday Party Plans



Birthday Party Plans

It's time to plan a birthday party! Program 2 sprites planning a birthday party as they move around the scene. Have them plan where, who, and food.

2 12 6 1



Submit ↑



3. Sound of Wolves

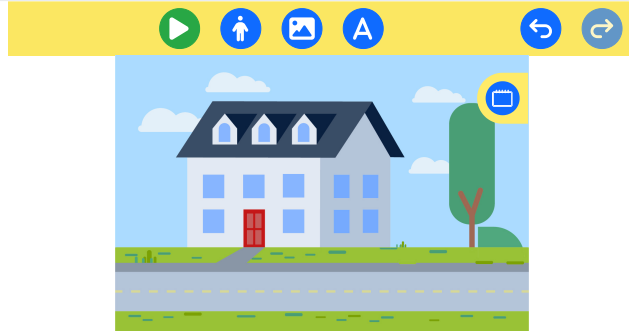


Sound of Wolves

Wolves have a unique howl, and each wolf's howl is like its own voice—other wolves can recognize who's howling from miles away! Program 2 wolf sprites moving around the scene. One should have a repeat loop movement. Then have one howl for the other to hear.

2 10 1 1 2

Submit ↑



4. Speed of Sound



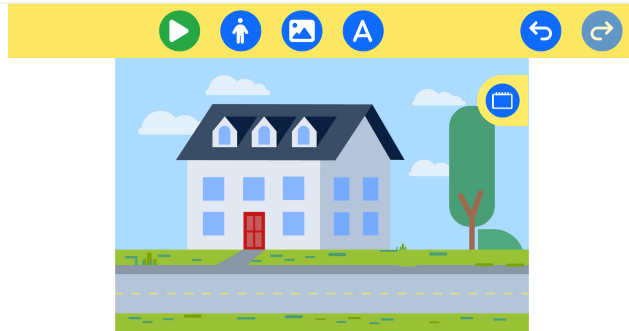
Speed of Sound

Did you know the speed of sound depends on temperature! In warmer air, sound travels faster?

Place the sun sprite somewhere on your scene. Then program one of the sound wave sprites to travel across the scene. Have it speed up when it reaches the sun, then slow down when it moves past it.

1 8 2 1

Submit ↑



5. Raining Food



Raining Food

Your sprite had a strange dream last night where food was falling from the sky! Program at least 3 food sprites (it can be 3 different or 3 of the same food) falling from the top of the scene. Use the control blocks to have them fall at different speeds. Use a forever loop end block to keep it raining food forever!



Submit ↑



Answer Keys & Solutions

Questions

1. What is a sequence of events in a program?

MULTIPLE CHOICE

Correct Answer:

- A. The final outcome of a program ✗ Incorrect
- B. The order of steps in a program ✓ Correct
- C. A list of characters in a program ✗ Incorrect
- D. The goal of the program ✗ Incorrect

Explanation:

Think about what happens first, next, and last in your game or story.

2. What is the goal of a program?

MULTIPLE CHOICE

Correct Answer:

- A. To create more bugs ✗ Incorrect
- B. To make the program difficult ✗ Incorrect
- C. To achieve the result you want ✓ Correct
- D. To make the program look pretty ✗ Incorrect

Explanation:

Why did you make the program? What do you want it to do in the end?

3. Why is it important to plan a program before you start coding?

MULTIPLE CHOICE

Correct Answer:

- A. So you can write as much code as possible ✗ Incorrect

B. So you can keep adding random things to the program

✗ Incorrect

C. So you don't need to think about the program

✗ Incorrect

D. So you know what steps to take and in what order

✓ Correct

Explanation:

Would you build a LEGO set without looking at the instructions first?

4. What happens if you don't plan your program first?

MULTIPLE CHOICE

Correct Answer:

A. The program will work better

✗ Incorrect

B. The program might not work as expected

✗ Incorrect

C. You won't have enough time to finish

✗ Incorrect

D. The program could be confusing and hard to fix

✓ Correct

Explanation:

Imagine trying to bake a cake without a recipe—what could go wrong?

5. What is one way to help make sure your program works properly?

MULTIPLE CHOICE

Correct Answer:

A. Ignore the steps and try to guess

✗ Incorrect

B. Test the program only once

✗ Incorrect

C. Plan the program before you start

✓ Correct

D. Change the program every time something goes wrong

✗ Incorrect

Explanation:

How do you make sure something goes right the first time?

1. Program Planning Matching

Matching Game Solutions:

1. →
2. →
3. →

Students must drag items from the left to match with corresponding items on the right.

2. Program Planning Race Car Order

Correct Order:

1. The car starts at the starting line
2. The car speeds up when the light says, "Go"
3. The car slows down at the curve
4. The car jumps over the ramp
5. The car crosses the finish line

Scoring:

- Gold: 1 attempts or fewer
- Silver: 2 attempts or fewer
- Bronze: 3 attempts or fewer

Students must arrange items in the correct sequence.

3. Program Planning Categories

Category Solutions:

Category 1: Goal

- You want the player to complete the game

Category 2: Sequence of Events

- The car starts at the starting line
- The car jumps over the ramp
- The car slows down at the curve

Category 3: Expected Outcome

- The player finishes the race without crashing
- The game ends when the player wins

Scoring:

- Gold: 1 attempts or fewer
- Silver: 2 attempts or fewer
- Bronze: 1 attempts or fewer

Students must sort items into their correct categories.