

Module 5 - Activity 14:

The Mine

Overview

Students use their computational thinking skills to solve puzzles by digging and climbing to get mine carts to the grey robot.

Computing PoS Reference

- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.
- Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

Learning Objective

- Learn to use selection in code to solve more than one problem.

Success Criteria

All: I can solve problems with code using selection criteria.

Most: I can solve problems with code using selection criteria and describe the sprites' behaviour using If, Then & Else statements

Some: I can solve problems with code using selection criteria, describe the sprites' behaviour using If, Then & Else statements and design a new level to the game with new selection criteria.

Key Words

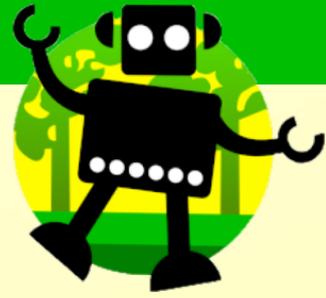
event, motion, block, debug, selection, If, Then, Else, forever, if touching, program, script, efficient.

Computer Science Concepts

- Algorithm design.
- Debugging.
- Control.
- Selection (If, Then & Else).

Introduction

Share the learning objective and the success criteria. Explain to students that they are going to use SELECTION to solve a problem using code. Discuss Selection and how it can be used in coding. Selection is about choice (e.g. If and Then statements). Watch Starting a new Adventure and continue through to "This is inside the mine..."



Activity 14: The Mine

EXPLORE: As a class, look at the mine scene and at the code. Make sure that pupils have seen the grey robot at the bottom of the mine.

Q: Can you identify the blocks which we have used before and what they do?

Q: Can you identify any new blocks? What do you think the new blocks do?

At “Drag any of these special blocks to the mine robot’s program.” Ask students to help you choose an motion block to test together as a class.

Drag the block to the program script and read/listen to the following on screen notes. Ask several students (or class vote):

Q: What do you think we should do? Why?

Q: Does it matter which square on the screen we click to change it’s colour to yellow? Why? (remind students the mine robot **MUST** touch the yellow square to perform the action).

Click on a square chosen by students, then click on the flag to run. Watch what happens as a class.

Remove the current motion block and choose another, then make another square yellow. Test each of the motion blocks before you solve the problem together.

Q: Can we add more than one yellow block?

Q: What are the benefits to this?

Q: Could this cause any problems?

If you need to reset the mine puzzle, click on the red octagon.

Once all motion blocks have been tested, remind students that we need to get the mine robot and the carts to the grey robot at the bottom of the screen, and solve together.

Look at the next problem as a class.

Remind pupils that an Algorithm is a sequence of precise instruction – precision brings with it efficiency. Discuss the meaning of efficient, providing everyday examples.

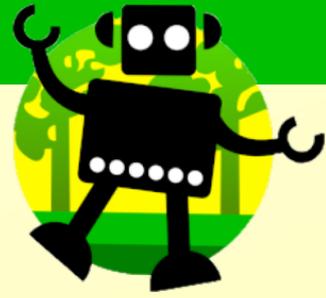
CHALLENGE: Work in pairs.

OFFLINE ACTIVITY: Work through the Planning the Dig sheets, discussing the most efficient solution. Once complete, work through the on-screen activities moving up to using all motion blocks within one single piece of code and attempting to solve the problem by creating an effective algorithm.

Can pupils set the colours up in effective locations before they run the program?

EVALUATE: Discuss, whether an If/Then statement was used to complete the task successfully.

Q: Could the problem be solved as effectively without using selection?



Activity 14: The Mine

SEN Support

- Provide students with whiteboard and pen so they can write out their plan for the code prior to testing.

Resources

- Planning the Dig.
- Whiteboard and pen.
- My Mine Design sheet.

Extension Activity

Pupils create their own mine puzzle using the My Mine Design Sheets.

Possible Key Questions For Assessment

What did you learn about coding today?

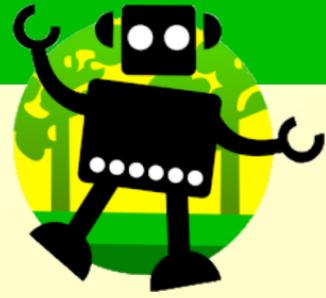
Can you explain what the problem was?

How did we solve the problem?

Can you think of any other motion blocks which could be useful for this activity?

Can you give an everyday example of selection including if, then & else?

i.e. if my alarm goes off, then I get out of bed, else I sleep in.

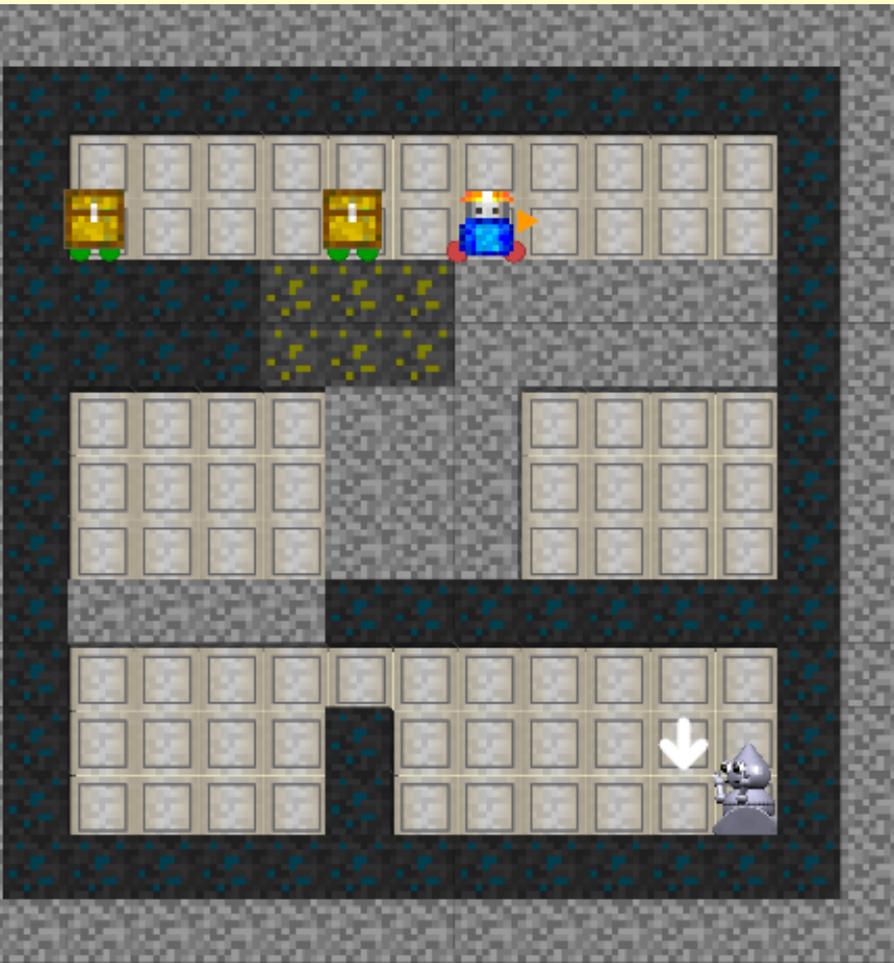


Activity 14: Planning the Dig

Problem

Choose the most efficient positions, then write each program that you will need to create, in sequence to be able to complete the task.

Q: Can you explain what the mine robot will do if it doesn't touch a coloured block?



build ladder to ceiling

dig down

dig sideways

Program 1

```
When Flag Clicked
Forever
  If touching ____ then
    [ ]
```

Program 2

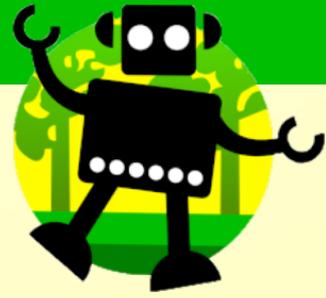
```
When Flag Clicked
Forever
  If touching ____ then
    [ ]
```

Program 3

```
When Flag Clicked
Forever
  If touching ____ then
    [ ]
```

Program 4

```
When Flag Clicked
Forever
  If touching ____ then
    [ ]
```

Activity 14: My Mine Solution

When Flag Clicked

Forever

If touching ____ then

If touching ____ then

If touching ____ then

When Flag Clicked

Forever

If touching ____ then

If touching ____ then

If touching ____ then