

Junior Coder

Lesson plan - 7

Debug Garden

Debugging and problem solving

Lesson # 7 - Debugging

| | | |
|-------------------------|---|---|
| Time: | 90-120 mins | |
| Objective: | Finding problem in existing solutions and solving them. | |
| Learning | What is Debugging? Debugging is finding and fixing problems in the instruction given to the computer. | |
| Computer Vocabulary: | Bug - Problems in the instruction given to the computer. Computers programmers need to test the code to verify that the instructions are right. Debugging - Finding problems in the instructions given to a computer and fixing those problems. | |
| Materials required: | iPad with Junior Coder downloaded. Pencil and activity sheet for unplugged activity. | |
| Common Core compliance: | CCSS.MATH.PRACTICE.MP1 | <i>Make sense of problems and persevere in solving them.</i> |
| | CCSS.MATH.PRACTICE.MP2 | <i>Reason abstractly and quantitatively</i> |
| | CCSS.MATH.PRACTICE.MP4 | <i>Model with mathematics.</i> |
| | CCSS.MATH.PRACTICE.MP5 | <i>Use appropriate tools strategically.</i> |
| | CCSS.MATH.PRACTICE.MP6 | <i>Attend to precision.</i> |
| | CCSS.MATH.PRACTICE.MP7 | <i>Look for and make use of structure.</i> |
| | CCSS.MATH.PRACTICE.MP8 | <i>Look for and express regularity in repeated reasoning.</i> |
| Activity: | Solve levels 1 to 5 in Debug Garden. (Students can work in pairs.) Step 1 - Understand the problem. Step 2 - Run the instructions as shown on the screen and try to identify the problem in the code sequence. Step 3 - Change the code block or the loop counter or the if conditions to make the program work. Step 4 - Verify your work. | |
| Creativity: | Go back to any of the games you like. Create a puzzle and use the code blocks to provide a solution. Make one or more mistakes in the instructions and give the game to a partner to see if they can figure out the problem. | |

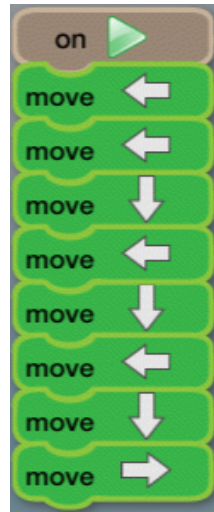
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Discussion:

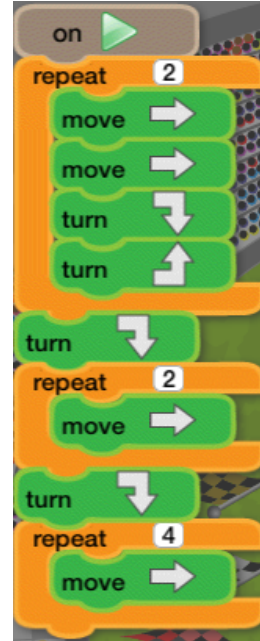
As a group discuss why debugging is important. Every written code has bugs. The more complex the code the more the bugs. A programmer has to think of all the situations when the code can be executed and it is very likely that they will make a mistake. So it is very important to test and verify the code that is written.

Solutions:

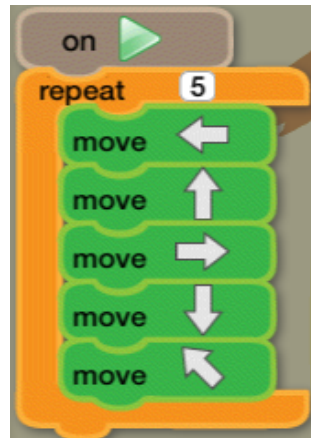
Level 1



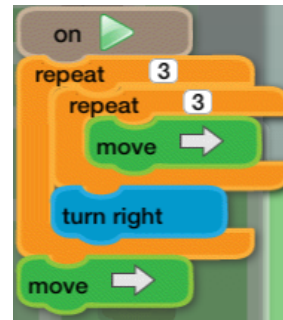
Level 2



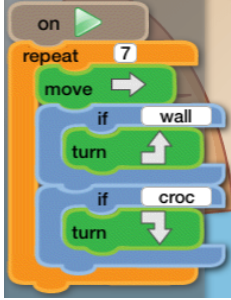
Level 3



Level 4








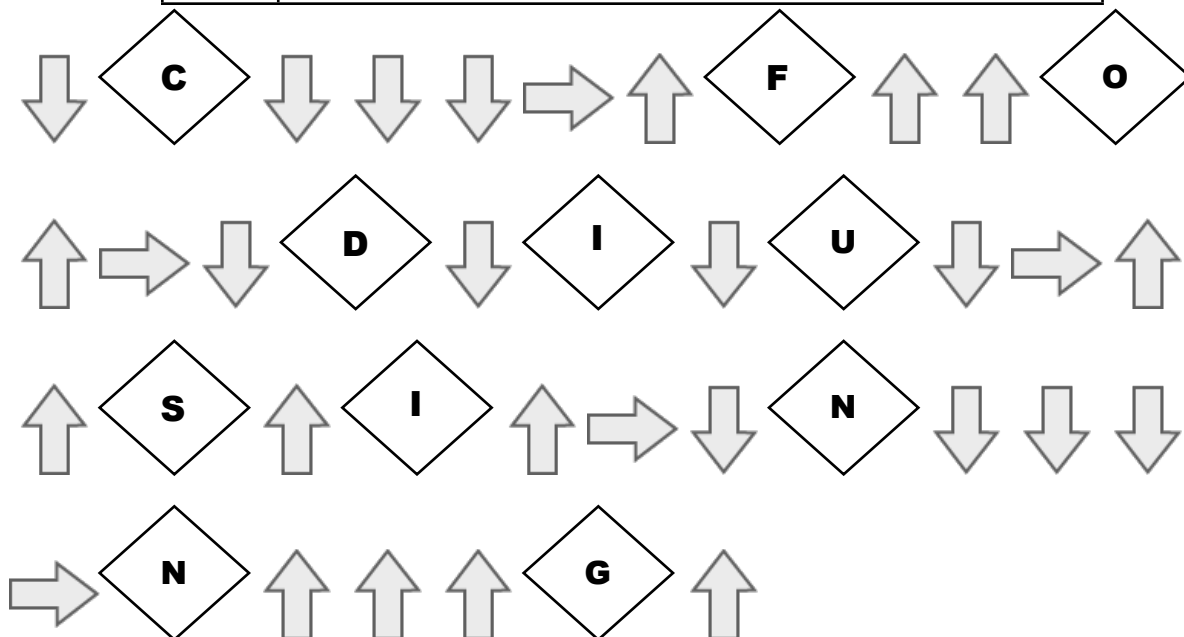
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|-------------------------------|---|--|
| | <p>Level 5</p>  | |
| Unplugged Activity | Hand out the activity sheet for Lesson #7. Let students follow the instructions in the sheet. | |
| Unplugged activity discussion | Discuss the problems in the activity #2. Some problems are - 1. What if the first user enters a letter instead of a number. Computers always follow instructions, humans may not. 2. What if the user gives a very very big number. | |

Activity # 1

Use the code sequence to fill the grid. There is one problem in the logic. Can you spot the problem.

| Code | Action |
|---|--|
|  | Move right one grid |
|  | Move left one grid |
|  | Move up one grid |
|  | Move down one grid |
|  | Write a letter in the grid. The letter inside the diamond indicates what letter you need to write. |



| | | | | | |
|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 9 | 10 | 11 | 12 | 13 | 14 |
| 17 | 18 | 19 | 20 | 21 | 22 |
| 25 | 26 | 27 | 28 | 29 | 30 |
| 33 | 34 | 35 | 36 | 37 | 38 |

Activity # 2

Discuss this activity with the whole class as a group. Here is the code sequence for a simple calculator which adds 2 numbers. One student can volunteer to read the algorithm.

| | |
|---|---------------------------------------|
| 1 | Ask user to enter a number. |
| 2 | Write down the number. |
| 3 | Ask the user to enter another number. |
| 4 | Write down the second number. |
| 5 | Add the 2 numbers together. |
| 6 | Show the result to the user. |

Can anyone spot a problem with the code. Write down your thoughts below. Remember every thought is important.

| | |
|---|--|
| 1 | |
| 2 | |