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BRAKESOFT



Coding for Kids curriculum

After finishing this course, students will have learned 21st-century skills such as critical thinking, problem-solving skills, innovation, communication and collaboration. There are 7 lessons in total which will give a basic understanding of coding and computational thinking.

No prior coding skills are needed to understand this course. The game "Hopper's Musical Adventure – Play with Harmony" is highly adaptable.

The main goal of the game is to take the main character, Hopper, from one point to another, by giving correct sets of instructions. As the character travels through the level, it jumps across path pieces. At the end of the level, the character collects music notes which play a small section of a melody. At the end of the chapter, the full melody plays. This full melody is comprised of all of the smaller sections of melodies collected in the levels throughout the chapter.



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Chapter 1 Commands and Sequences

Time: 15-25 minutes Game: Hopper's musical adventure Reference book: Coding alphabets for kids

Commands: Commands are specific actions given to the computer to perform tasks. **Sequences:** The order in which commands are given.

In levels 1-10, the player will learn about commands and sequences and how they work. During gameplay, in each level, the player taps up, down, left and right buttons to create a list of movement steps for the character to take, once the play button is pressed. These steps are **commands** for movement. The order in which you place the symbols is known as the **sequence**. In the screenshot below, the player has given 3 right commands, 2 up commands and 1 left command to reach the destination.

If a wrong command has been entered, it will be marked with a red "X". As a result, the number of stars that a player receives at the end of a level will be reduced.

In programming, code is written to give commands to computers to perform tasks.





Chapter 2 Bug and Debug

Time: 15-25 minutes Game: Hopper's musical adventure Reference book: Coding alphabets for kids

Bug: A bug is an error in a piece of code **Debug:** Debugging is the process of identifying and fixing the error.

In this chapter, the player will learn how to solve problems. Level 11-20 deals with identifying and fixing errors. In programming, errors are known as **bugs**. A piece of code must be **debugged** before you can run or compile it. As shown in the image below, the red 'X' is displayed as a result of an error as a wrong command has been given. When an icon with a 'lock' is displayed, this indicates that a correct command has been given. If a 'lock' icon is not displayed, this also indicates that an incorrect command has been given.





Chapter 3 Functions

Time: 15-25 minutes Game : Hopper's musical adventure Reference book: Coding alphabets for kids

Function: A function is a collection of commands grouped together and given a name. The set of commands can then be run with just the name of the Function whenever that set is needed.

In programming, it is sometimes easier to combine existing commands to create a new behaviour. This is called composition. When a behaviour is named so that it can be used again in the future, a **function** is created. Functions make programs easier and faster. As shown in the image below, the function command can be used to reduce the number of commands necessary to reach the goal. One function includes two icons, the icons inside the function can be changed as needed.





Chapter 4 Loop

Time: 15-25 minutes Game : Hopper's musical adventure Reference book: Coding alphabets for kids

To continue running a function once it has ended, a **loop** is needed. 'For' loops run a block of code over and over for a set number of times. 'While' loops, on the other hand, run a block of code over and over until certain conditions are met. This will be discussed further in the next chapter. The figure below shows the 'Loop' button icon. This button allows the player to use a loop and to increase the number of times the function should repeat within the loop.

In the example below it is used 3 times to go right. The loop has been used twice which is equal to six steps or six icons. Loops make the execution faster and easier.





Chapter 5 Conditional Code

Time: 15-25 minutes Game : Hopper's musical adventure Reference book: Coding alphabets for kids

In this lesson you will learn about the IF/EISE statements and conditional codes in real life and also computer science.

Conditional code: Something you test that results is true or false. Condition is appropriate way to make the decision. A block of code that will only run if something is true is conditional code. It is common way for programmer to solve unknown condition.

As shown in the image below, if the player uses Jump icon when there is empty space on the path, hopper flies over it.

Just like we make decisions, when given some actions computers do make decisions. We use IF/ ELSE statement everywhere and everyday in our life. For example, before you go outside you have an IF statement that says IF it is raining then take an umbrella with you ELSE No need. Computers are amazing once you decide those kinds of statements that they can reliably execute those things and in an unbelievable speed. A computer program really is a little bit of math and some IF statements where the decision is made.





Chapter 6 Varibales

Time: 15-25 minutes Game : Hopper's musical adventure Reference book: Coding alphabets for kids

Variable: A variable is a named container that stores a value. It also represents a value that can change after it has been initialized.

As shown in the image below, the number of steps have been counted and the number of enemies faced, number of notes that have been picked and their value has changed over time.





Chapter 7 Algorithm

Time: 15-25 minutes Game : Hopper's musical adventure Reference book: Coding alphabets for kids

Algorithm: An algorithm is step-by-step sets of rules or instructions to accomplish a goal in computer programming. It is something you do every day that requires multiple steps to complete. As shown in the image below you need to use different commands step-by-step to reach the goal. Single command, loop, function and condition and jump command to reach the goal.

Think about baking the cake. How many steps do you need to use to make a tasty cake?t





About Brakesoft

Brakesoft is an independent game development studio located in Tampere, Finland. We are an enthusiastic, creative, skilled, energetic and hard working team. Our main aim is to create games of patience, determination, entertainment, frustration, and education. We believe in team work and helping each other. In right circumstances, we are ready to co-operate with like minded peoples and companies.

Our main mission is to create dynamic, engaging, addictive, entertaining and unique educational games which teach fundamental of coding to young kids. More than programming we focus on computational thinking for kids. We believe that everyone should learn about coding to create the better world and to solve everyday problems easily. We want to help kids become next Mark Zuckerberg, Bill Gates and Steve Jobs and it should start from very early stage.

Our vision is to make the education more fun, creative and innovative. We want to be one of the global companies to help people to learn by playing.

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