MTH1W

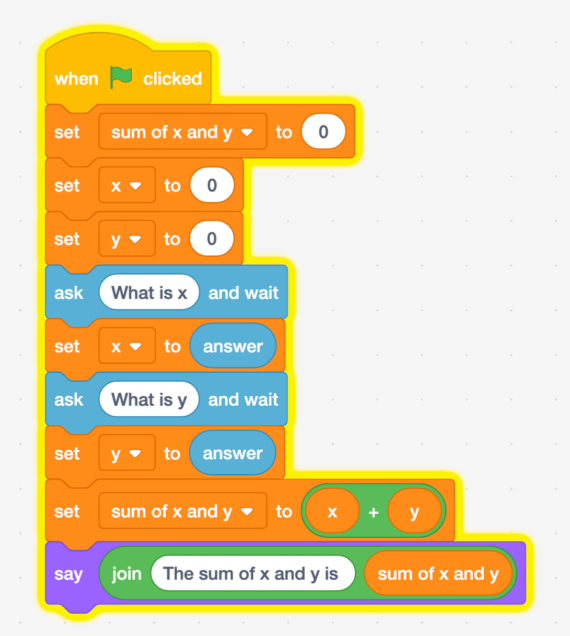
Coding Assignment #1 – Powers

Learning Goals: *apply coding skills to represent mathematical concepts and relationships related to powers.*

Success Criteria: *be able to create a program using Scratch to simplify and evaluate operations with powers.*

Task 1: Read this block of code. What do you think it does? Explain in detail then try it using the link to see if you are right.

https://scratch.mit.edu/projects/789449894



What does the program do?

- gets user input for 2 numbers and assigns them to variables called ‘x’ and ‘y’

- adds the values of the two variables together and stores the sum as a new variable called ‘sum of x and y’

- prints the statement ‘The sum of x and y is {sum of x and y}’

- When the flag is pressed all variables are set back to zero and the user is prompted for inputs

Task 2: Write pseudocode that would tell a program how to evaluate a power based on user inputs for the base and exponent of the power.

Pseudo code:

- create variables for the base of the power (base), exponent of the power (exponent), and value of the power (value)

- set base and exponent to zero

- set value to 1 (initial value of exponential function)

- ask user for input for base and exponent of power. Assign these values to their corresponding variables.

- create a loop that multiplies the value by the base and stores the answer to value. The loop should run as many times as equal to the exponent of the power.

- Print the statement that says ‘The value of the power is {value}’

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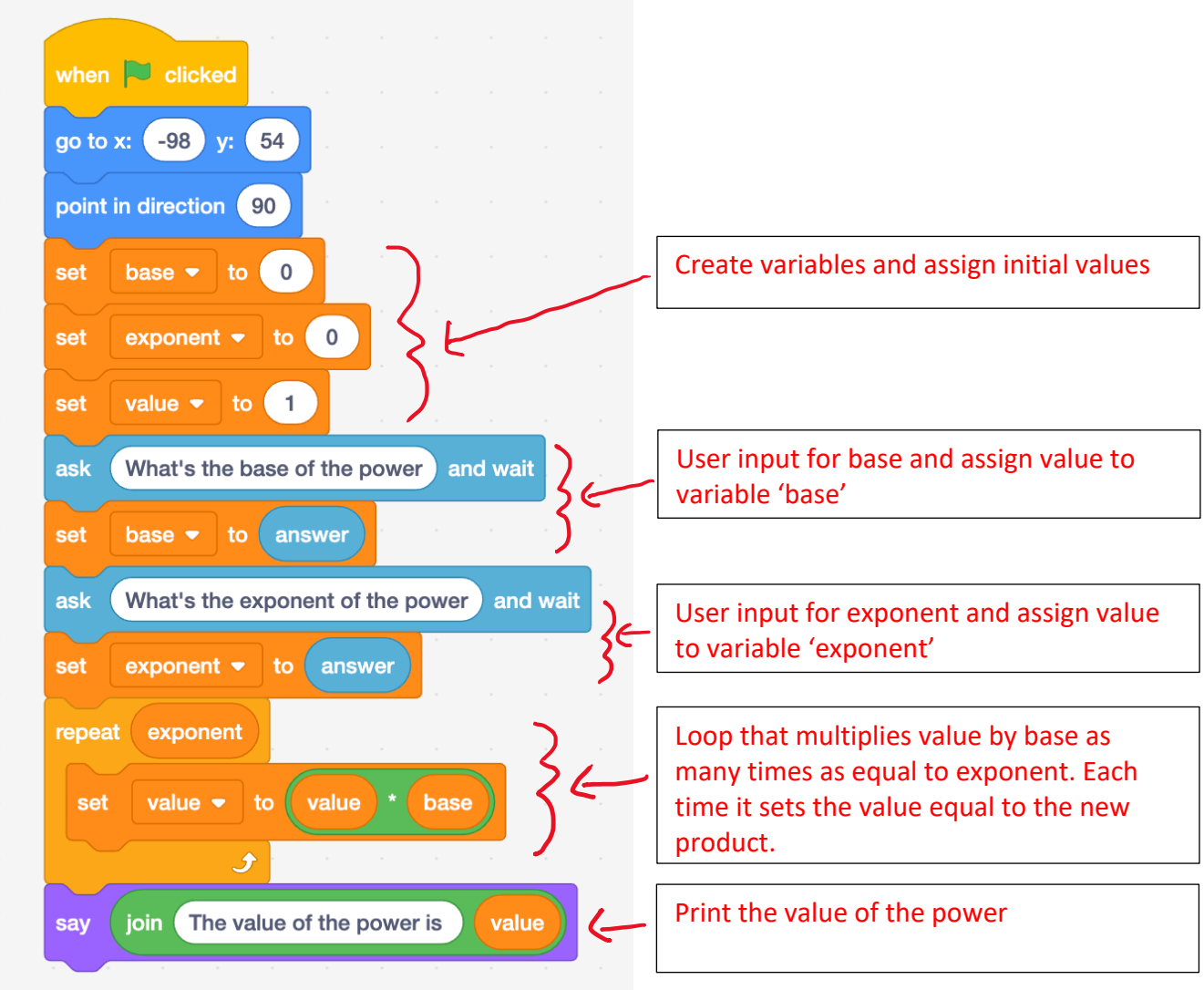
Task 3: As a class, create a program in Scratch that evaluates a power based on user inputs for the base and exponent of the power.



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Task 4: In groups, fix this program so that it works properly with negative exponents. Start by writing down pseudo code for how the code needs to be altered.

Pseudo code:

Need to use and elif statement to create a conditional code that runs differently depending on if the value of the exponent is greater than or less than 0.

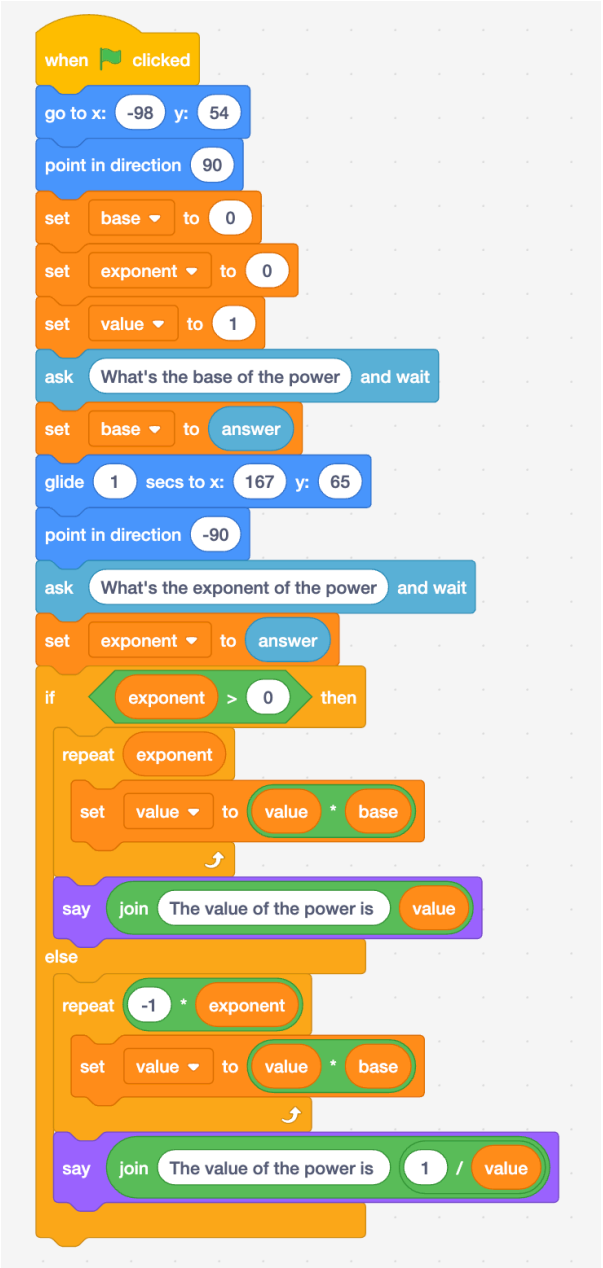
After getting input from user about base and exponent and storing the values in their respective variables…

If exponent > 0:

- Multiply value by base and store as the new value. Repeat as many times as equal to the exponent
- Print the value of the power

Else

- Multiply the exponent by negative one and store as the new value of the exponent
- Multiply value by base and store as the new value. Repeat as many times as equal to the exponent
- Do 1/value and set as the new value
- Print the value of the power



https://scratch.mit.edu/projects/788884882

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Task 5: Try out the following program that explains the product rule of powers. Press 'See Inside' and analyze the code and backdrops to get an idea of how it works.

$$(x^a)(x^b) = x^{a+b}$$

https://scratch.mit.edu/projects/792262944

Task 6: Write a program in Scratch that uses and explains the quotient rule of powers. Start by writing your pseudo code here. Then write your program in Scratch and share your link with your teacher.

$$\frac{x^a}{x^b} = x^{a-b}$$

Pseudo code:

a

Category	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding Demonstrates knowledge and understanding of powers, exponent rules, and block coding.	demonstrates limited understanding of content	demonstrates some understanding of content	demonstrates considerable understanding of content	demonstrates thorough understanding of content
Thinking Use of planning using pseudo code. Shows critical/creative thinking when designing program.	uses planning skills with limited effectiveness	uses planning skills with some effectiveness	uses planning skills with considerable effectiveness	uses planning skills with a high degree of effectiveness
Communication Able to use block code to create a program that clearly communicates knowledge of exponent rules.	expresses and organizes ideas and information with limited effectiveness	expresses and organizes ideas and information with some effectiveness	expresses and organizes ideas and information with considerable effectiveness	expresses and organizes ideas and information with a high degree of effectiveness
Application Transfer knowledge and skills of how to use coding to evaluate powers to create a new program that applies the quotient rules of powers.	transfers knowledge and skills to new contexts with limited effectiveness	transfers knowledge and skills to new contexts with some effectiveness	transfers knowledge and skills to new contexts with considerable effectiveness	transfers knowledge and skills to new contexts with a high degree of effectiveness

Comments: