

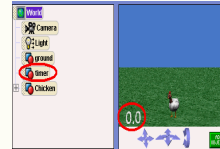
## Timers

Alice



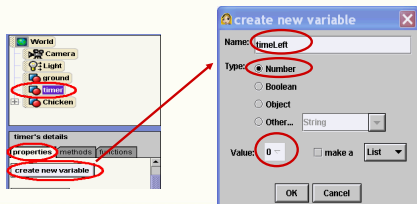
## Example

- Game programs often make use of a timer – some mechanism to keep track of the time remaining in the game.
- We will construct a timer.
- First, add a 3D text object to the world.
  - Any string of digits could be used. We arbitrarily chose "0.0"



## Creating a new variable

- Select the timer object and then create a new variable named *timeLeft*.
  - The *isOn* variable is **declared** to be a Number type.
  - The value is 0 (the game hasn't begun, as yet).



## Start the timer

- At the start of the game, the timer's *timeLeft* variable must be initialized to the amount of time allowed for playing the game. (This example uses seconds, but minutes would work just as well.)
- Storyboard for a method to initialize the *timeLeft* variable:

```
Initialize
parameter: amountOfTime
timeLeft is set to a value specified by amountOfTime
```



## Counting down

- In this example, the timer will count down to 0 (no seconds left on the clock).
- Storyboard for a *countDown* method:

```
countDown
Do in order
  While timeLeft is greater than 0
  Do in order
    update the 3D text to show the remaining number of seconds
    decrease timeLeft by 1
    update the 3D text to display 0 seconds
```

Note: The last instruction updates the 3D text display after the **While** loop ends .



## class-level function

- To coordinate the game with the timer's countdown, write a function that returns the value of the *timeLeft* variable.

```
timer.howMuchTimeIsLeft No parameters
```

```
No variables
```

```
[Do Nothing]
```

```
Return timer.timeLeft
```



## Demo

- Ch10Lec1aTimer
- Concepts illustrated in this example
  - ✦ The value in a variable can be used in a conditional expression to control a loop.
    - Ⓞ The value of *timeLeft* is compared to 0.
  - ✦ The value in a variable can be changed at runtime.
    - Ⓞ The value of *timeLeft* is decreased by 1 each time through the *While* loop.
  - ✦ A number can be displayed as a text string by calling a built-in conversion function (*as a string*).



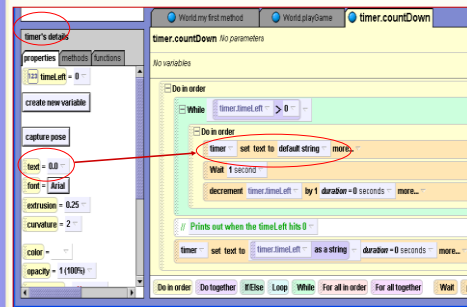
## Timer Object

- We needed to use a variable to keep track of the time left – a numeric value.
- The timer object is from the 3-D text class. It does not store a numeric value such as we needed to implement a timer.
- We used the timer object to display the current value of the numeric variable.
- How?

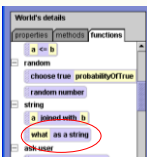


## Using 3D Text to Display Values

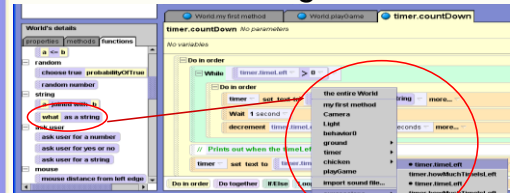
- A 3D text object displays a string
- We can change what it displays by using the timer's **text** property as follows:
- Drag the Text tile to the program pane, and choose Default String as a placeholder..



- Then we use the World function *what as a string* to convert the numeric value into text so that it can be displayed by the 3D text object:



## Resulting in:



# And finally:

The image shows a Scratch code editor window titled 'timer.countDown'. The code is as follows:

```
timer.countDown > 0  
Do in order  
  While timer.countDown > 0  
    Do in order  
      timer set text to timer.countDown as a string more...  
      Wait 1 second  
      decrement timer.countDown by 1 duration = 0 seconds more...  
    Points out when the timer hits 0  
  timer set text to timer.countDown as a string duration = 0 seconds more...
```

A red oval highlights the 'timer set text to timer.countDown as a string more...' block within the while loop.

