

CompSci 4
Chap 6 Sec 1
September 25, 2007

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Announcements

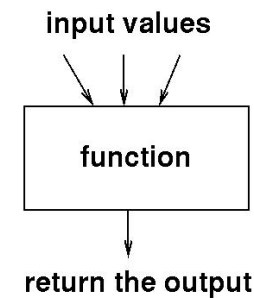
- Midterm exam next Thursday
 - Closed book, closed notes, closed neighbor
 - Chaps 1-2, Chaps 4, 6, html
 - Will give you an old exam to work on over the weekend, then review next Tuesday
- Assignment 4 storyboard due today
 - Alice world due Thursday

What we will do today

- Lecture on Chap 6, Sec 1 - Functions
- Classwork

Functionality

- A function
 - Receives value(s)
 - Performs computation on value(s)
 - Returns (sends back) a value

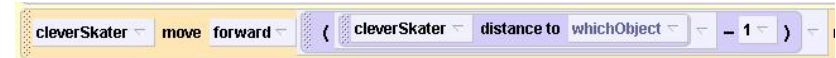


Types of functions

- The type of a function depends on the type of value it returns
 - a calculated value (a number)
 - a specific object
 - a color
 - etc.

Built-in functions

- Used one of Alice's built-in functions
 - *skateAround* method for the *cleverSkater*



- Let's look at another example.

Example

- Move ball to within 1 meter of net, then bounce ball over the net.
 - Bounce - Ball should move up and forward, then down and forward



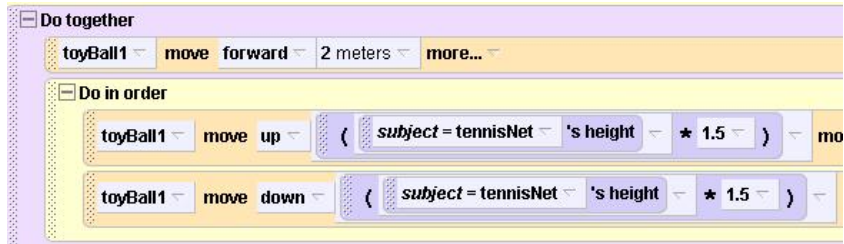
Move Ball to 1 meter from Net

- Use “distance to” function and math



Height

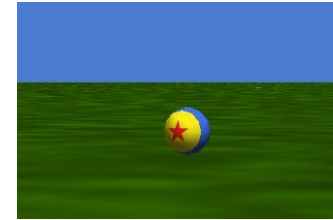
- Can use the built-in height function to determine the height of the net and move the ball up that distance



Demo – what happens?

Rolling the ball

- How do we roll the ball along the ground?
- Want a realistic motion rather than a slide
- The ball must simultaneously move and roll.



Demo: A first attempt

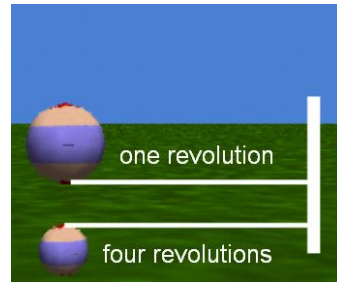


Revising the Approach

- The ball is made to roll 1 revolution.
- What if we want the ball to roll a certain distance?
- How can we make the ball roll the correct number of revolutions to cover a given distance along the ground?

Number of Revolutions

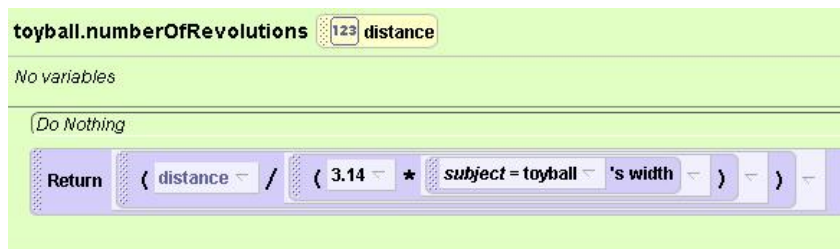
- The number of revolutions depends on the size of the ball
 - The number of revolutions is $\text{distance} / (\text{Pi} * \text{diameter})$
- There is no built-in function to return the number of revolutions
 - Must write it!



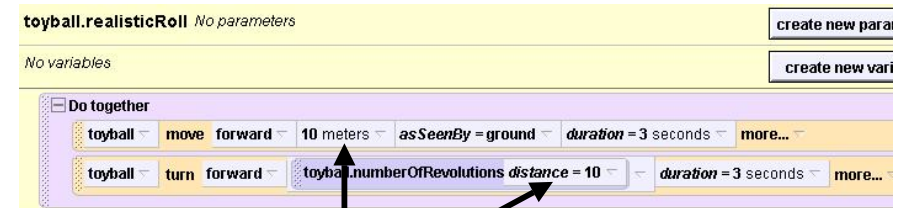
Parameters

- We want to return the value computed as $\text{Distance} / \text{Pi} * \text{diameter}$
- Obviously, what is needed
 - The ball's diameter
 - The ball object has a built-in width question
 - The distance the ball is to travel
 - Can be sent as a parameter to the question

numberOfRevolutions function



Demo: Calling the function



This is a test value

- Run the animation with several test values
- Make sure it works as expected
- What happens if you use a negative value?

Now Ball roll to net?

- Difficult....
- ToyBall turn to face TennisNet and roll, what happens?

Tricky – Orient To

The screenshot shows a visual programming interface with several action blocks for a 'toyBall1' object:

- toyBall1 orient to ground more...
- toyBall1 turn to face tennisNet more...
- ground turn to face tennisNet more...
- toyBall1.realisticRoll distance = (toyBall1 distance to tennisNet - 1)
- toyBall1 orient to world more...
- toyBall1 turn to face tennisNet more...
- Do together** (purple background)
 - toyBall1 move forward 2 meters more...
 - Do in order** (yellow background)
 - toyBall1 move up (subject = tennisNet 's height * 1.5)
 - toyBall1 move down (subject = tennisNet 's height * 1.5)

Levels of functions

- As with methods, you can write functions as either class-level or world-level. (what was the function we just wrote?)
- Guidelines for class-level methods apply to class-level functions:
 - No references to other objects
 - No references to world-level functions
 - Built-in world-level functions are ok

Classwork today

