Name: _____



BOOTSTRAP: 2

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Class:



Workbook v0.9

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Lesson 1

	Racket Code	Pyret Code
	(define AGE 14)	AGE = 14
	(define A-NUMBER 0.6)	A-NUMBER = 0.6
8	(define SPEED -90)	SPEED = -90
Numbers		Two of your own:
	(define CLASS "Bootstrap")	CLASS = "Bootstrap"
	(define PHRASE "Coding is fun!")	PHRASE = "Coding is fun!"
	(define A-STRING "2500")	A-STRING = "2500"
SS		Two of your own:
Strings		

```
(define SHAPE
                                          SHAPE =
     (triangle 40 "outline" "red"))
                                            triangle(40, "outline", "red")
    (define OUTLINE
                                          OUTLINE =
                                            star(80, "solid", "green")
     (star 80 "solid" "green"))
   (define SQUARE
                                          SQUARE =
     (rectangle 50 50 "solid" "blue"))
                                            rectangle(50, 50, "solid", "blue")
                                                    One of your own:
    (define BOOL true)
                                          BOOL = true
Booleans
    (define BOOL2 false)
                                                    One of your own:
    ; double : Number -> Number
                                          # double : Number -> Number
    ; Given a number, multiply by
                                          # Given a number, multiply by
    ; 2 to double it
                                          # 2 to double it
    (EXAMPLE (double 5) (*
                                  5)
                                          examples:
Functions
    (EXAMPLE (double 7) (* 2
                                              double(5) is 2 * 5
                                  7))
                                              double(7) is 2 * 7
    (define (double n) (*
                                          end
                                  n))
                                          fun double(n):
                                              2 * n
                                          end
```

Fast Functions!
Fill out the contract for each function, then try to write two examples and the definition by yourself.

# <u>d</u>	ouble :	Number	-> Number
exampend end fun	double (5 double (7 double (2 * n) is 2 * 5) is 2 * 7 n n):	n
end #	name	domain	-> range
examp	oles: () is) is	
end fun	():	

Fast Functions!
Fill out the contract for each function, then try to write two examples and the definition by yourself.

#	:	domain	>	range	
examples:				·	
		,			
end	(_) is			
fun	(_):		
end					
#	:	domain	->	range	
examples:					
	(_) is _) is			
end	(·
fun	(_):		

Fast Functions!

Fill out the contract for each function, then try to write two examples and the definition by yours	Fill c	out the	contract for	r each	function,	then t	ry to	write two	o examples	and the	definition I	y v	yourse
---	--------	---------	--------------	--------	-----------	--------	-------	-----------	------------	---------	--------------	-----	--------

#	:	domai	> _	range	
examples:					
	(_) is			
	(_) is _			
end					
fun	():		
end					
#	•		->_		
Haine		domai		range	
		domai		range	
	(in		
	(_) is			
examples: end	(_) is	in		
examples:	(_) is	in		
examples:end	(_) is _) is _	in		

	Bug Hunting: Pyret Edition				
#1	SECONDS = (7)				
	STRING = my string SHAPE1 = circle(50 "solid" "blue")				
#2	SHAPE2 = triangle(75, outline, yellow)				
#3	<pre># triple : Number -> Number # Multiply a given number by # 3 to triple it examples: triple(5) = 3 * 5 triple(7) = 3 * 7 end</pre>				
#4	<pre>fun triple(n): 3 * n</pre>				
#5	<pre># ys : Number -> Number # Given a number, create a solid # yellow star of the given size examples: ys(99) is star(99, "solid", "yellow") ys(33) is star(99, "solid", "yellow") ys(size): star(size "solid" "yellow") end</pre>				

Lesson 2

Word Problem: double-radius

Write a function double-radius, which takes in a radius and a color. It produces an outlined circle of whatever color was passed in, whose radius is twice as big as the input.

	contract has three parts:			
#	:			>
:	name	Domain		Range
#				
	Wh	at does the function do	?	
	camples examples of your function in a	ection		
exar	mples:			
	()	is	
	the user types			
-	which sho	ould become		
	()	is	
	the user types	,		
-	w	hich should become		
end				
	n he changes in the examples, an ne code, copying everything tha		names where you	find variables!
fun	(_):	
end				

Word Problem: double-width

Write a function double-width, which takes in a number (the length of a rectangle) and produces a rectangle whose width is twice the given length.

name	•	 Domain		->
		DOMATH		Range
		does the function do)?	
e Examples				
te examples of	your function in action	on		
xamples:				
	()	is	
th	e user types			
	which should	become		
)	is	
the u	ser types			
1	which	should become		
nd				
nction				
cle the changes i	n the examples, and n			
ite the code, cop	ying everything that isr	n't circled, and using r	names where you	tind variables!
un	(_):	
	,		*	

Word Problem: next-position
Write a function next-position, which takes in two numbers (an x and ycoordinate) and returns a JumperState, increasing the x-coordinate by 5 and decreasing the y-coordinate by 5.

Contrac	t+Purpose Statement			
Every co	intract has three parts:			
#	:		_	>
	nme	Domain		Range
#				
"		at does the function do?	?	
Give Exar	mples			
	amples of your function in a	ction		
exam	ples:			
_	()	is	
	the user types	,		
	which sho	uld become		
	,			
_	(the user types)	is	
	and ass. c) positi			
		nich should become		
end	٧٧١	nen snouta become		
Function Circle the	e changes in the examples, an	d name the variables.		
Write the	code, copying everything tha	t isn't circled, and using no	ames where you	find variables!
fun .	(_):	
	,			
_				
end				

Data Structure

A CakeT is a flavor, layers, & is-iceCream
data CakeT:
cake(
)
end
To make instances of this structure, I would write:
cake1 =
cake2 =
To access the fields of cake2, I would write:

Word Problem: taller-than

Write a function called *taller-than*, which consumes two CakeTs, and produces true if the number of layers in the first CakeT is greater than the number of layers in the second

Contro	act+Purpose Statement				
#	:			>	
#					
	kamples				
exam	ples:				
	(_)	is		
)	is		
end					
Functio	on .				
fun	(_):		
end					

Word Problem: will-melt

Write a function called *will-melt*, which takes in a CakeT and a temperature, and returns true if the temperature is greater than 32 degrees, AND the CakeT is an ice cream cake.

Contro	act+Purpose Statement				
#	:			>	
#					
Give Ex	camples ples:				
	()	is		
	()	is		
end Functio					
			_):		
end					

Lesson 3

Animation Design Worksheet

Draw a sketch for three distinct moments of the animation

		2.6 6.6.6.6				
	Sketch A	Sk	cetch B		Sketch C	
Vhat thin	gs are changing?					
	ing	How does it chan	ige?		Does it change con	sistently?
Mara L. Carla			1 - 1 0			
		represent the things that score, playerIMG)		pe (Number,	String, Image, Boole	an)
Circle t	he items held	ow that you will n	eed to writ	te or edit	Check them	off
	ou finish eac	•	000 10 WIII	io oi odii.		711
	Sample inst	ances				
	draw-stat	e :	-> I	mage		
		e-tick :				
		e-key :				
	reactor					

Data Structures

# a	State is a
data	State:
I	
)
end	•
Make three s	ample instances that represent the <u>sketches</u> from the
orevious pag	e:
	A =
	в =
	c =
Write an exc	imple for one of the functions on the previous page:

Animation Design Worksheet

Draw a sketch for three distinct moments of the animation

		2.6 6.6.6.6				
	Sketch A	Sk	cetch B		Sketch C	
Vhat thin	gs are changing?					
	ing	How does it chan	ige?		Does it change con	sistently?
Mara L. Carla			1 - 1 0			
		represent the things that score, playerIMG)		pe (Number,	String, Image, Boole	an)
Circle t	he items held	ow that you will n	eed to writ	te or edit	Check them	off
	ou finish eac	•	000 10 WIII	io oi odii.		711
	Sample inst	ances				
	draw-stat	e :	-> I	mage		
		e-tick :				
		e-key :				
	reactor					

Data Structures

# a	State is a
data	State:
[
)
end	
Make three orevious pa	sample instances that represent the sketches from the ge:
	_A =
	_B =
	_c =
Write an ex	ample for one of the functions on the previous page:

Animation Design Worksheet

Draw a sketch for three distinct moments of the animation

		2.6 6.6.6.6				
	Sketch A	Sk	cetch B		Sketch C	
Vhat thin	gs are changing?					
	ing	How does it chan	ige?		Does it change con	sistently?
Mara L. Carla			1 - 1 0			
		represent the things that score, playerIMG)		pe (Number,	String, Image, Boole	an)
Circle t	he items held	ow that you will n	eed to writ	te or edit	Check them	off
	ou finish eac	•	000 10 WIII	io oi odii.		711
	Sample inst	ances				
	draw-stat	e :	-> I	mage		
		e-tick :				
		e-key :				
	reactor					

Data Structures

# a	State is a	
data	State:	
l		
)
end		
Make three s	sample instances that represent the sketches from the	
orevious pag		
	_A =	
	_B =	
	_c =	
Write an exc	ample for one of the functions on the previous page:	

Animation Design Worksheet

Draw a sketch for three distinct moments of the animation

	Sketch A	Ske	tch B	Sketch C	
Vhat thin	gs are changing?				
	ning	How does it change	?	Does it change consis	tently?
Vhat field	ds do you need to rep	resent the things that c	change?		
Field	I name (dangerX, sco	re, playerIMG)	Datatyp	pe (Number, String, Image, Boolean)
	the items below you finish each.	that you will ne	ed to writ	te or edit. Check them off	
	Sample instan	ices			
	draw-state	:	> I	mage	
				_>	
				String ->	
	reactor				

Data Structures

# a	State is a
data	State:
I	
end	
Make three	sample instances that represent the sketches from the
orevious pa	
	_A =
	_B =
	_c =
Write an ex	ample for one of the functions on the previous page:

Lesson 4

Word Problem: location

Write a function called *location*, which consumes a JumperState, and produces a String representing the jumper's location: either "cliff", "beach", "water", or "air".

Con	tract+Purpose State	ement				
# _		:			>	
# _						
Give	Examples mples:					
		()	is		_
		()	is		
		()	is		_
		()	is		

end

Function

fun			():	
	if _				
	else i	.f			:
		-			
	else i	.f			:
	else:				
	end				
end					

Piecewise Bug-Hunting

	Buggy Code	Correct Code / Explaination
Round 1	<pre>fun piecewisefun(n): if (n > 0): n else: 0</pre>	
Round 2	<pre>fun cost(topping): if string-equal(topping, "pepperoni"): 10.50 else string-equal(topping, "cheese"): 9.00 else string-equal(topping, "chicken"): 11.25 else string-equal(topping, "broccoli"): 10.25 else: "That's not on the menu!" end end</pre>	
Round 3	<pre>fun absolute-value(a b): if a > b: a - b b - a end end</pre>	
Round 4	<pre>fun best-function(f): if string-equal(f, "blue"): "you win!" else if string-equal(f, "blue"): "you lose!" else if string-equal(f, "red"): "Try again!" else: "Invalid entry!" end end</pre>	
Round 5	<pre>fun my-function(x): if (4 < 8): x else: x * 2 end end</pre>	

Word Problem: sun-color

Write a function called *sun-color*, which consumes a SunsetState, and produces an image of a sun (a solid, 25 pixel circle), whose color is "yellow", when the sun's y-coordinate is greater than 225, "orange", when its y-coordinate is between 150 and 225, and "red" otherwise.

Contr	ract+Purpose Statement			
#	:			->
#				
	examples mples:			
	()	is	
	()	is	
	()	is	
	()	is	
end				

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Function

n	():
if		
else if		
else if		
else:		
end		
d		

Lesson 5

Word Problem: red-shape

Write a function *red-shape*, which takes in the name of a shape (such as "circle", "triangle", "star", or "rectangle"), and draws that solid, red shape. Use 50 as the radius of the circle and star, and side-length of the triangle. Make the rectangle 99 pixels long by 9 wide.

#	<u>:</u>	->
#		
examples:		
	() is	
end		
Function		
ask:		
	<u> </u>	tnen:
	<u> </u>	then:
		then:
		then:
end		

30

end

Word Problem: strong-password

Websites have strict password requirements. Write a function strong-password, which takes in a username and password, and checks to make sure they aren't the same, and then checks the string-length of the password to make sure it is greater than 8 characters. The function should return a message to the user letting them know if their password is strong enough.

#			:			->		
#								
Civo F	Example	\						
	nples							
				() i	S	
				() i	S	_
				() i	s	
end								
Functi fun	on		():			
Luii	ask:	1			/·			then:
		I						
end	end	I	otherwise:_		 			

Building Your Helper Functions

# is-off-right	: :	->	
examples:			
	() is	
	() is	
end			
fun	():	
end			
# is-off-left	:	->	
examples:			
-	() is	
	·		
•	() is	
end			
	(
end fun	():	

#	::	>	
examples:			
	() is	
	() is	
end	1	ν.	
fun	():	
end			
#	::	>	
examples:			
	() is	
	() is	
end	,		
fun	():	
end			

Word Problem: line-length

Write a function called *line-length*, which takes in two numbers and returns the difference between them. It should always subtract the smaller number from the bigger one.

		÷				>	
/e Exar	mples						
xam	ples:						
_		()	is		
_		()	is		
nd							
	Header						
nction	Header		() :		
nction			(variable n			
nction un .			(
nction un .	function name		(
nction un	function name		(
nction un	function name		(
un .	function name		(
nction un	function name		(
nction un	function name		(
nction un	function name		(

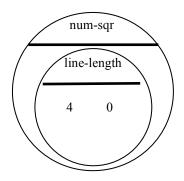
Distance:

The Player is at (4, 2) and the Target is at (0, 5). Distance takes in the player's x, player's y, character's x and character's y.

Use the formula below to fill in the EXAMPLE:

$$\sqrt{\left(line-length \;\; 4 \;\;\; 0\;\right)^{\;2} \;\; + \; \left(line-length \;\; 2 \;\;\; 5\;\right)^{\;2}}$$

Convert it into a Circle of Evaluation. (We've already gotten you started!)



Convert it into Pyret code:

Word Problem: distance Write a function distance, which takes FOUR inputs: px: The x-coordinate of the player

	py: The y-coor cx: The x-coor		-			
It shou	ld return the c	listance betwe	en the two, using	g the Distance formu	ıla:	
	Dista	ance ² = (lin	e-length px c	x) ² + (line-lengtl	າ py cy) ²)	
Contro	act+Purpose S	tatement				
#		:			->	
	camples examples of ye	our function ir	action			
exai	mples:					
		()	is		
•						
		()	is		
end						
Functio	n					
fun			_():		

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end

Word Problem: is-collision Write a function is-collision, which takes FOUR inputs:

	px: The x-coordinate of the player py: The y-coordinate of the player cx: The x-coordinate of another game character cy: The y-coordinate of another game character It should return true if the coordinates of the player are within 50 pixels of the coordinates of the other character. Otherwise, false.
Contra	act+Purpose Statement
#	>
Give Ex Write e	amples examples of your function in action
exar	mples: () is
-	
-	
end	
Functio	n
fun	():
end	

Using Helpers inside next-world:

How does the World structure change when...?

TEST		RESULT	
	world(_		
)
	world(_		
)
	world(_		
)
	world(_		
)
			,

Supplemental

DESIGN RECIPE

Contract+Purpose Sta					
Every contract has thr	ee parts:				
#	•			->	
name	•	Dom	 nain	Range	
#					
#		oes the function	 on do?		
Civa Evapordos					
Give Examples Write examples of you	ur function in actio	on			
examples:					
	()	is		
the use	er types				
	which should	become			
	1	`	÷ a		
the user t	(ypes)	is		
	which	should becom			
end	winch	should become	C		
Function Circle the changes in th	e examples, and n	ame the vai	riables.		
fun	():		
end ———					

DESIGN RECIPE

Contrac <u>t</u> +	Purpose Statement				
Every con	tract has three parts:				
#	•			->	
π name	• e	Dom	ain	Range	
ш					
#	NA/L	nat does the function			
		iat does the function	on do:		
Give Examp	oles	1.			
write exar	nples of your function in c	action			
examp	les:				
01101111	()	is		
	the user types	/	±0		
	which ch	ould become			
	willCit Sile	outa become			
	()	is		
	\ the user types	/	13		
end	w	hich should become	2		
CIId					
Function					
Circle the c	changes in the examples, ar	nd name the var	iables.		
fun _	():		
	,		,		
end					

Contracts

Name	Domain	Range	example
#		→	
#		→	
#		→	
#		→	
#		→	
#		→	
#		→	
#	:	→	
#		→	
#		→	
#		→	
#		→	
#		→	
#		→	
#		→	
#		→	
#		→	
#		•	

Contracts

Name	Domain	Range	example
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		•	
#		^	