CS in Algebra
Student Workbook

Reverse Engineering

Thing in the game...	What changes about it?	More specifically...

Video Game Planning

Use this form to plan out your video game. Once your game is complete, the player will move up and down, the target and danger will move from left and right, and you will earn points by touching the target and lose points by touching the danger.

Created by:

The game takes place in:

This will be the background image in your game

The player is a:

The player moves up and down

The target is a:

The Target moves left and right

The danger is a:

The Danger moves left and right

Fast Functions

_____ : _____ -> _____
       name   *domain*   *range*

Example: _____ (_____) = _____

Example: _____ (_____) = _____

Define: _____ (_____) = _____

_____ : _____ -> _____
       name   *domain*   *range*

Example: _____ (_____) = _____

Example: _____ (_____) = _____

Define: _____ (_____) = _____

_____ : _____ -> _____
       name   *domain*   *range*

Example: _____ (_____) = _____

Example: _____ (_____) = _____

Define: _____ (_____) = _____

_____ : _____ -> _____
       name   *domain*   *range*

Example: _____ (_____) = _____

Example: _____ (_____) = _____

Define: _____ (_____) = _____

The Design Recipe

Description:

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
    function name   *domain*   *range*

_____
what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
             function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
             function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
          function name   *variables*

_____
what the function does with those variables

word problem
rocket-height

Description: A rocket blasts off, traveling at 15 meters per second. Write a function called 'rocket-height' that takes in the number of seconds that have passed since the rocket took off, and which produces the height of the rocket at that time.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
    function name   *domain*   *range*

_____
what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
           function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
           function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
        function name   *variables*

_____
what the function does with those variables

Directions: Use the Design Recipe to write a function 'update-danger' which takes in the danger's x-coordinate and produces the next x-coordinate, which is 10 pixels to the left.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
    function name   *domain*   *range*

_____
what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
              function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
              function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
           function name   *variables*

_____
what the function does with those variables

Directions: Use the Design Recipe to write a function 'update-target' which takes in the target's x-coordinate and produces the next x-coordinate, which is 10 pixels to the right.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
    function name   *domain*   *range*

_____
what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
            function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
            function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
         function name   *variables*

_____
what the function does with those variables

Directions: Write a function called update-player, which takes in the player's y-coordinate and the keycode of the key pressed, and returns the new y-coordinate.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
    function name   *domain*   *range*

_____
                                what does the function do?

Examples

Write some examples for your function in action...

Example: _*update-player*_ (_128 38_) = _____
            function name   *input(s)*   *what the function produces*

Example: _*update-player*_ (_128 40_) = _____
            function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
        function name   *variables*

_____   _____

_____   _____

_____

Key Code Reference

When you press a key on your keyboard, a unique numeric code is sent to your computer, which is then translated into a letter, number, or command. Use this handy key code reference sheet to make your Player sprite respond to different key presses.

Key	Code	Key	Code
left arrow	37	G	71
up arrow	38	H	72
right arrow	39	I	73
down arrow	40	J	74
0	48	K	75
1	49	L	76
2	50	M	77
3	51	N	78
4	52	O	79
5	53	P	80
6	54	Q	81
7	55	R	82
8	56	S	83
9	57	T	84
A	65	U	85
B	66	V	86
C	67	W	87

word problem
line-length

Directions: 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

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
    function name   *domain*   *range*

_____
                                  what does the function do?

Examples

Write some examples for your function in action...

Example: _____*line-length*_____ (_____*10*   *5*_____) = _____*10 - 5*_____
             function name   *input(s)*   *what the function produces*

Example: _____*line-length*_____ (_____*2*   *8*_____) = _____*8 - 2*_____
             function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
         function name   *variables*

_____   _____

_____   _____

_____

Directions: Write a function 'distance', which 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 use the Distance formula to return the distance between both points

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
     function name   *domain*   *range*

_____
                        what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
          function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
          function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
         function name   *variables*

_____
                      what the function does with those variables

Directions: Write a function 'distance?', which 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
-

Is the player's x and y within 100 pixels of the other character's x and y

Contract and Purpose Statement

Every contract has three parts...

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    function name   *domain*   *range*

_____
what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
    function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
    function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
    function name   *variables*

_____
what the function does with those variables

Description: Write a function 'safe-left?', which takes in an x-coordinate and checks to see if it is greater than -50.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
    function name   *domain*   *range*

_____
what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
        function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
        function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
        function name   *variables*

_____
what the function does with those variables

Description: Write a function 'safe-right?', which takes in an x-coordinate and checks to see if it is less than 450.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
   function name   *domain*   *range*

_____
what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
     function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
     function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
     function name   *variables*

_____
what the function does with those variables

onscreen?

CODE

Description: Write a function 'onscreen?', which takes in a character's x-coordinate and checks to see if it is safe on the left and on the right.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____
    function name   *domain*   *range*

_____
                      what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____
             function name   *input(s)*   *what the function produces*

Example: _____ (_____) = _____
             function name   *input(s)*   *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =
          function name   *variables*

_____
             what the function does with those variables