Instructional Days: 16-17

Topic Description: This lesson introduces And, Or and randomness. Students have an opportunity to practice utilizing

these features in the context of programs.

Objectives:

The students will be able to:

• •Use conditionals with And and Or to write a grade program.

• •Use a random number generator to write a dice program. Outline of the Lesson:

• •Journal Entry (5 minutes)

• •And/Or discussion (15 minutes)

• •Grades program (35 minutes)

• •Random lecture (20 minutes)

• •Dice (35 minutes)

Student Activities:

• •Complete journal entry.

• •Participate in And/Or discussion.

• •Develop Grades program.

• •Participate in discussion of Random.

• •Complete Dice program.

Teaching/Learning Strategies:

•Journal Entry: What’s the difference between And and Or? What does the word random mean in English? o Students should complete individually and then share with their elbow partners.

•And/Or Discussion

o Start with a few journal entries about And and Or.

o Kinesthetic And/Or Activity (Following is a possible set of conditions.)

Tell the students to stand up if the condition is true.

Say: If (you are a girl AND you are wearing blue) stand up.

• •Find a girl that is not wearing blue and is sitting. Ask her why she is sitting if she’s a girl? ( Answer: she’s not wearing blue)

• •Ask: How many parts of the condition must be true for you to stand up if it is an AND? (Answer: both)

Say: If (you are a boy OR you are wearing blue) stand up.

• •Find a boy that is standing but is not wearing blue. Ask: Why are you standing if you are

NOT wearing blue? (Answer: I’m a boy)

• •Ask: How many parts of the condition must be true for you to stand up if it is an OR? (

Answer: at least one)

• •Ask: If both parts of the condition are true for an OR, is it ok to stand? (Answer: YES!)

o Show the students the “and” and “or” blocks in Scratch.

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Emphasize how they are hexagon shaped and take two other hexagons. o Show the students Grades Project.

•Grades

o Circulate and help students with projects.

o If many students are stuck, build the “B” part of the code together as a class.

o In the last minute, have students share their solutions with their elbow partners.

•Random lecture

o Have a few students share their journal entries about what random means.

o Ask: if I roll a pair of dice, will the numbers come out in order (2, then 3, then 4 the next roll, etc.) (

Answer: Most likely not)

o Roll a pair of dice a few times to prove it.

o This unpredictability is called randomness.

o Randomness can make games more exciting.

For example, how many spaces will I get to move this turn?

o Randomness is also used in computer science for simulations and in scientific/statistical experiments. o Walk students through dice.sb showing them the “pick random \_ to \_” block.

Explain that the numbers create the range that the random integer can fall under. The block works inclusively. Therefore 1 to 6 will produce numbers 1,2,3,4,5,6.

•Dice

o Instruct students to finish dice.sb so that it creates a pair of dice. They can create their own look for the

dice.

o Circulate and help students with projects.

o In the last minute, have students share their solutions with their elbow partners.

Resources:

• •Grades Project

• •grades solution.sb •dice.sb

•dice solution.sb

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Grades Project

Your task is to make a Scratch program that will tell you the letter grade based on the percentage.

• Create a variable grade.

• Double click grade to display the scroll bar.

• When the green flag is clicked, the program should look at the value of grade and the sprite should respond with

a letter as follows:

A: greater than 90

B: greater than 79 and less than 90 C: greater than 69 and less than 80 D: greater than 59 and less than 70 F: less than 60

At Crazy High School, students only qualify for tutoring if they have a B OR a D. After it says the grade, make your program say “You qualify for tutoring” if the grade is a B or D.

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Instructional Day: 18

Topic Description: This lesson requires students to apply their knowledge of conditionals to develop a Rock Paper

Scissors program in Scratch.

Objectives:

The students will be able to:

•Apply knowledge of conditionals to complete a Rock Paper Scissors program.

Outline of the Lesson:

• •Review of Rock Paper Scissors rules (5 minutes)

• •Rock Paper Scissors discussion (10 minutes)

• •Rock Paper Scissors project (40 minutes)

Student Activities:

• •Review Rock Paper Scissors rules.

• •Participate in Rock Paper Scissors discussion.

• •Complete Rock Paper Scissors project

Teaching/Learning Strategies:

•Review of Rock Paper Scissors rules

o Lead a class discussion—students volunteer to share the rules for Rock, Paper Scissors.

•Rock Paper Scissors discussion

o Give students a tour of rps starter.sb.

Show them how there are variables for ROCK, PAPER and SCISSORS.

•Ask: Why might it be easier to work with the variables instead of just using numbers?

(Answer: It makes the code easier to read.) Show students variables for player and computer.

•Ask how does the computer determine if they will choose rock, paper, or scissors? (Answer: It randomly chooses one using “pick random 0 to 2”.)

• Closely examine the computer’s “when I receive showPick” script

• •Explain how the else part works if the condition of the if is false.

• •Ask: Why don’t you need a statement that says “if computer = scissors”? (Answer: You

asked if it was = to rock and that was false, then you asked if it was equal to paper and that was false so the only thing left was for it to equal scissors. Hence, you can just put the “switch to costume scissors” in the else.)

• Instruct students that they only need to change the script that starts with “When I receive determine winner” under the computer sprite. (They may change more features if they have time.)

•Facilitate them in writing some pseudo code to handle all the cases for the computer choosing ROCK. Remind students that this is an algorithm.

o Create two versions, one like rps solution.sb and one like rps solution b.sb.; this way students can choose the method that they understand better.

o Show students a working example in presentation mode (so they can’t see the blocks). Exploring Computer Science—Unit 4: Introduction to Programming 172

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•Rock Paper Scissors project

o Circulate room and help students with projects.

o Allow students to try various approaches to solving the problem.

o If students finish, offer them extra credit for keeping score of the wins for the computer and player.

Resources:

• •rps starter.sb

• •rps solution.sb

• •rps solution b.sb

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