HOUR OF CODE

Conditionals with Cards
adapted from
Code Studio, Course 2
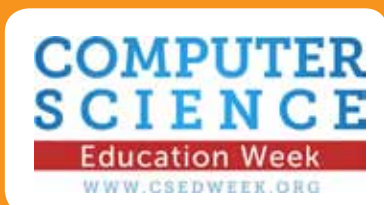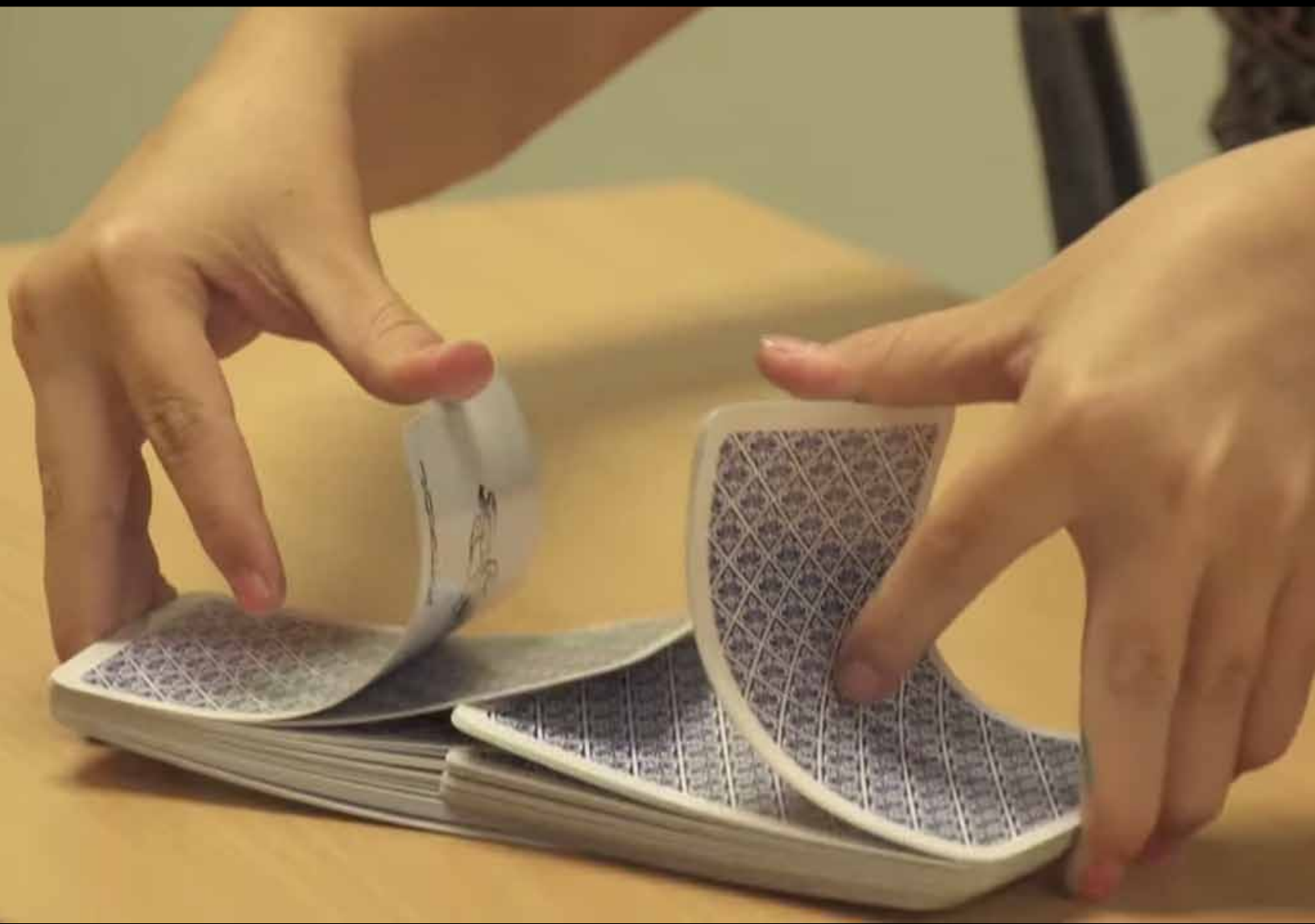
Lesson time: approximately 1 hour

LESSON OVERVIEW

We don't always know ahead of time what things will be like when we run our computer programs. Different users have different needs, and sometimes you will want to do something based off of one user's need that you don't want to do with someone else. That is where conditionals come in. This lesson demonstrates how conditionals can be used to tailor a program to specific information.

TEACHING SUMMARY

Getting Started - 15 minutes
1) Prepare
2) Vocabulary

Activity: Conditionals with Cards - 30 minutes
3) Conditionals with Cards

Wrap-up - 10 minutes
4) Flash Chat - What did we learn?
5) Vocab Shmocab

Assessment - 5 minutes
6) Conditionals with Cards Assessment

LESSON OBJECTIVES

Students will:
- Define circumstances when certain parts of programs should run and when they shouldn't
- Determine whether a conditional is met based on criteria
- Traverse a program and predict the outcome, given a set of input

MATERIALS, RESOURCES AND PREP

For the Student
   Playing Cards
   Paper for keeping track of how a program reacts to a card
   Pens & Pencils
   Conditionals with Cards Assessment

For the Teacher
   This Teacher Lesson Guide
   One Sample Program for the class to look at
   Print one Conditionals with Cards Assessment for each student

GETTING STARTED (15 MIN)

1) Prepare

If this is the first time that your class has attempted a programming activity (whether plugged or unplugged) then there are a few things you will need to cover before jumping into the Conditionals with Cards lesson. This example should bring your class up to speed.

To begin, your class will need to understand the idea of an algorithm (*a list of steps that you can follow to finish a task*) as well as loops (*the action of doing something over and over again*) and eventually conditionals (*statements that only run under certain conditions*). It is not required that you define each of those terms before you present them with examples. It can be easier to comprehend the definitions if they have had experience with the concepts.

Get the classroom's attention. Let them know that you're going to play a game.

"If I raise my arms, I want you all to stand up. Then, if I put them down, I want you to sit. Ready?"

Raise your arms and watch the class stand. Put them down and make sure they sit. Run through the combination a couple of times, using whatever order you like. When you're certain that they have it, add some more detail.

"If I clap when I raise my hands, I want you to clap when you stand. Else, stand quietly."

Go through this action a few times to see how the class deals with the If/else aspect. When you're comfortable that they get it, go one step further. Head to the board to write it down so that the class can glance at the directions, in case they forget.

1. Start with the student at the first desk.
2. If student shouts "Ready!" I give direction. Else, I move to next student.
     * If I raise my hand, the student shouts their name.
     * Else, student shouts my name.

Play through the game for a full round, if you have time. When you're done, you will have shown the students what an algorithm is (by listing out the steps of the game), what a loop is (by repeating the steps over and over for each student) and what a conditional is (by doing one thing "if" you raise your hand, and something else otherwise).

You can point to each of those segments when you cover vocabulary.

2) Vocabulary
This lesson has three important words:

Algorithm - Say it with me: Al-go-ri-thm
A list of steps that you can follow to finish a task

Conditionals - Say it with me: Con-di-shun-uls
Statements that only run under certain conditions

Loop - Say it with me: Loop
*The action of doing something over and over again*

ACTIVITY: (30 MIN)

3) Conditionals with Cards

Directions:

1. Create a few programs with your class that depend on things like a playing card's suit, color, or value to award or subtract points. You can write the program as an algorithm, pseudocode, or actual code.

Here is a sample algorithm:

> **If (CARD is RED)**
>   Award YOUR team 1 point
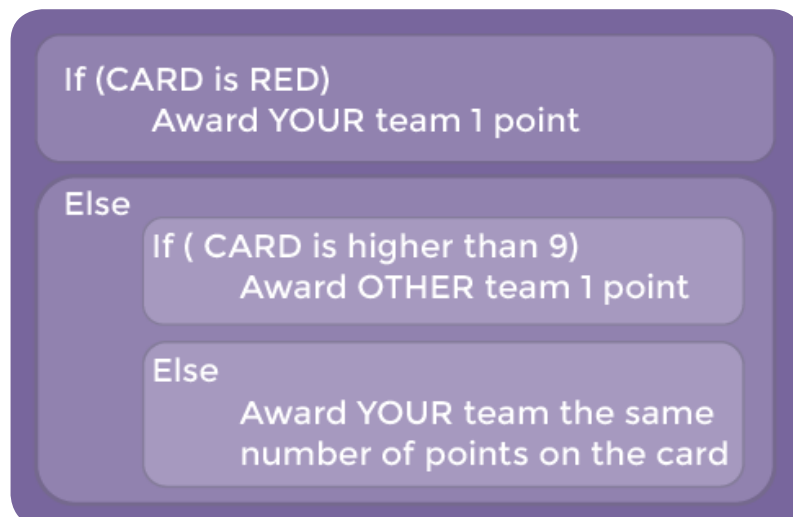>
> **Else**
>   Award OTHER team 1 point
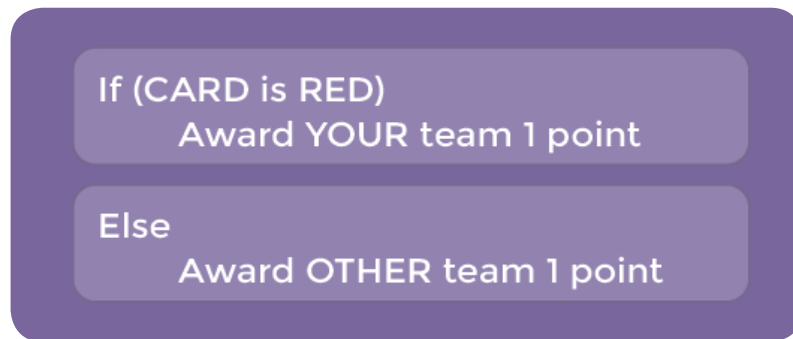
This program has you chose a card. If the card is red, your team gets a point. Else, the other team gets a point.

2. Decide how you want to split your class into teams.

3. Each team should have a pile of cards (at least as many cards as team members) nearby.

4. Put one of your "Programs" up on the board for all to see.

5. Have the teams take turns drawing cards and following the program to see how many points they score in each round.

6. Play several times with several different programs to help the students really understand conditionals.

Once the class has had some practice, you can encourage students to nest conditionals inside one another:

This program has you choose a card. If the card is red, your team gets a point. Else, the card must be black. If your black card is higher than 9, then the other team gets a point, else your card must be black and lower than or equal to 9, and you get as many points as are on your card.

> **If (CARD is RED)**
>   Award YOUR team 1 point
>
> **Else**
>   **If (CARD is higher than 9)**
>   Award OTHER team 1 point
>
>   **Else**
>   Award YOUR team the same number of points on the card

WRAP-UP (10 MIN)

4) Flash Chat: What did we learn?

If we don't include loops as part of our algorithm, how many people would get to play?

What other things do you do during the day under certain conditions?

If you are supposed to do something when the value of a card is more than 5, and you draw a 5, do you meet that condition?

Notice that conditions are either "True" or "False." There is no assessment of a condition that evaluates to "Banana."

When you need to meet several combinations of conditions, we can use something called "nested conditionals."
   - What do you think that means?
   - Can you give an example of where we saw that during the game?

Do you need to put a conditional statement after "Else"? Why not?

What part of that game did you like the best?

LESSON TIP

Flash Chat questions are intended to spark big-picture thinking about how the lesson relates to the greater world and the students' greater future. Use your knowledge of your classroom to decide if you want to discuss these as a class, in groups, or with an elbow partner.

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6) Vocab Shmocab
Which one of these definitions did we learn a word for today?

   - "Adding additional space to the beginning of a line of text"
   - "A combination of yellow and green"
   - "Statements that only run under certain conditions"

...and what is the word that we learned?

ASSESSMENT (5 MIN)

7) Conditionals with Cards Assessment
Hand out the assessment worksheet and allow students to complete the activity independently after the instructions have been well explained. This should feel familiar, thanks to the previous activities.

EXTENDED LEARNING

Use these activities to enhance student learning. They can be used as outside of class activities or other enrichment.

True/False Tag
   Line students up as if to play Red Light / Green Light. Select one person to stand in front as the Caller. The Caller chooses a condition and asks everyone who meets that condition to take a step forward.
      "If you have a red belt, step forward."
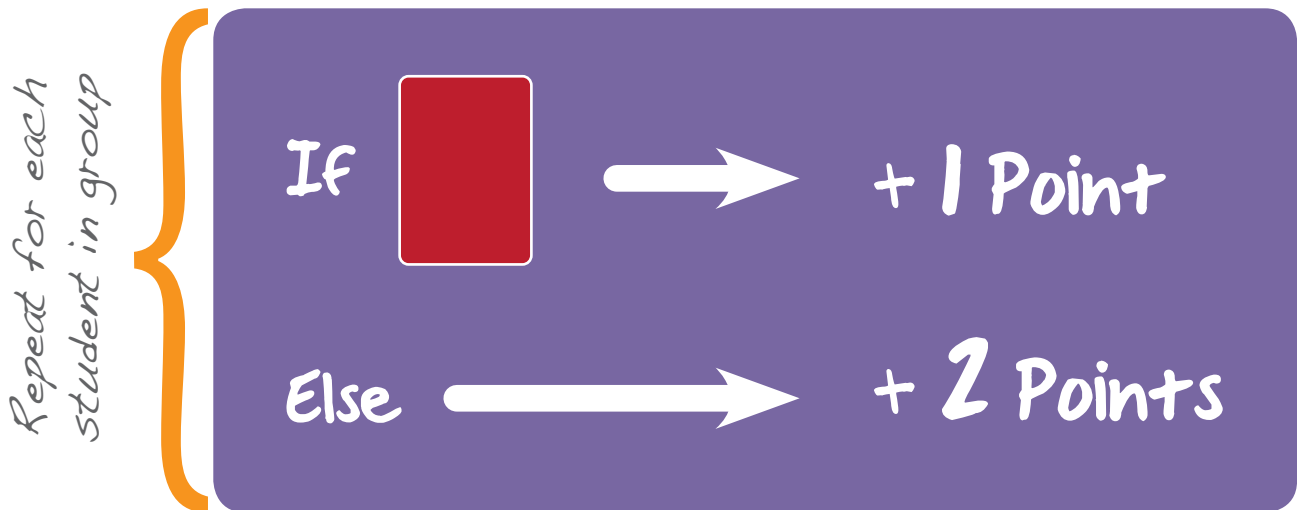   *"If you are wearing sandals, take a step forward."*
   Try switching it up by saying things like "If you are not blonde, step forward."
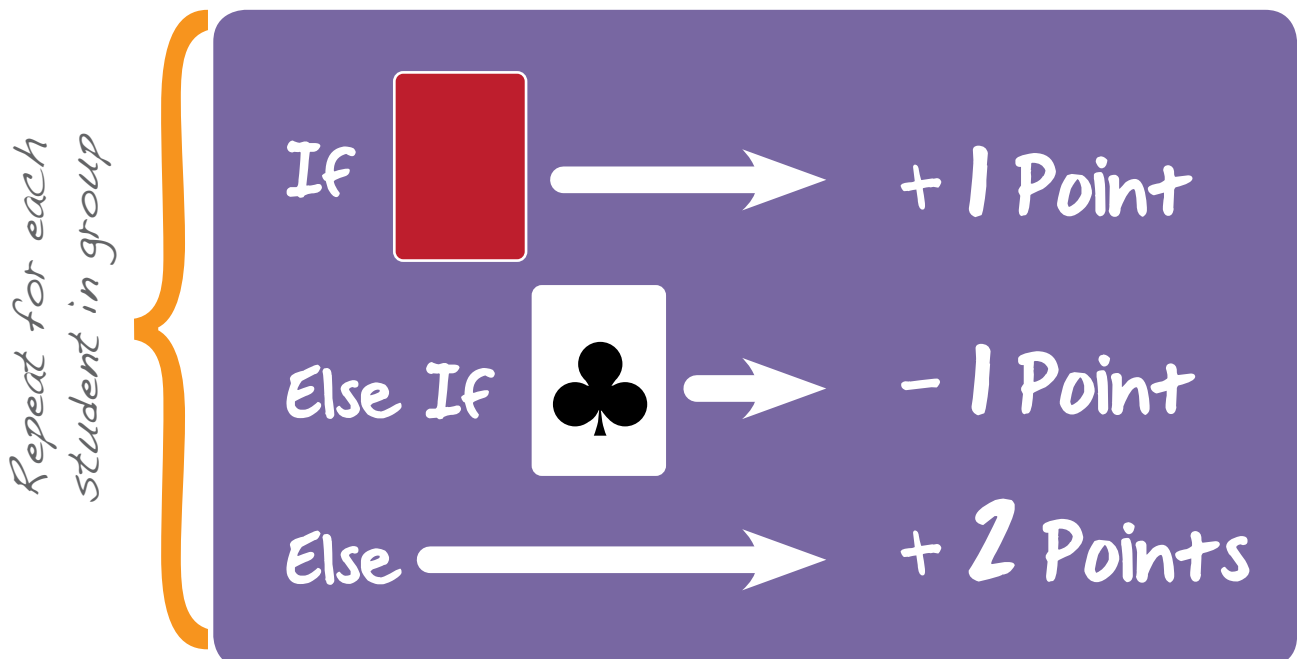
Nesting
      1. Break students up into pairs or small groups.
      2. Have them write if statements for playing cards on strips of paper, such as:
         If the suit is clubs
         If the color is red
      3. Have students create similar strips for outcomes.
         Add one point
         Subtract one point
      4. Once that's done, have students choose three of each type of strip and three playing cards, paying attention to the order selected.
      5. Using three pieces of paper, have students write three different programs using only the sets of strips that they selected, in any order.
      6. Encourage students to put some if statements inside other if statements.
      7. Now, students should run through all three programs using the cards that they drew, in the same order for each program.

   Did any two programs return the same answer? Did any return something different?

Sample algorithm #1

If 🟥 ➡️ **+ 1 Point**

Else ➡️ **+ 2 Points**

Repeat for each student in group

Sample algorithm #2

If 🟥 ➡️ **+ 1 Point**

Else If ♣ ➡️ **– 1 Point**

Else ➡️ **+ 2 Points**

Repeat for each student in group

Sample program as algorithm

If (CARD is RED)
    Award YOUR team 1 point

Else
    Award OTHER team 1 point

This program has you choose a card. If the card is red, your team gets a point. Else, the other team gets a point.

Sample program from above as pseudocode
(like code, but in no particular language)

```
If (card.color == RED){
     points.yours = points.yours + 1;
}

Else {
     points.other = points.other + 1;
}
```

Sample program as algorithm
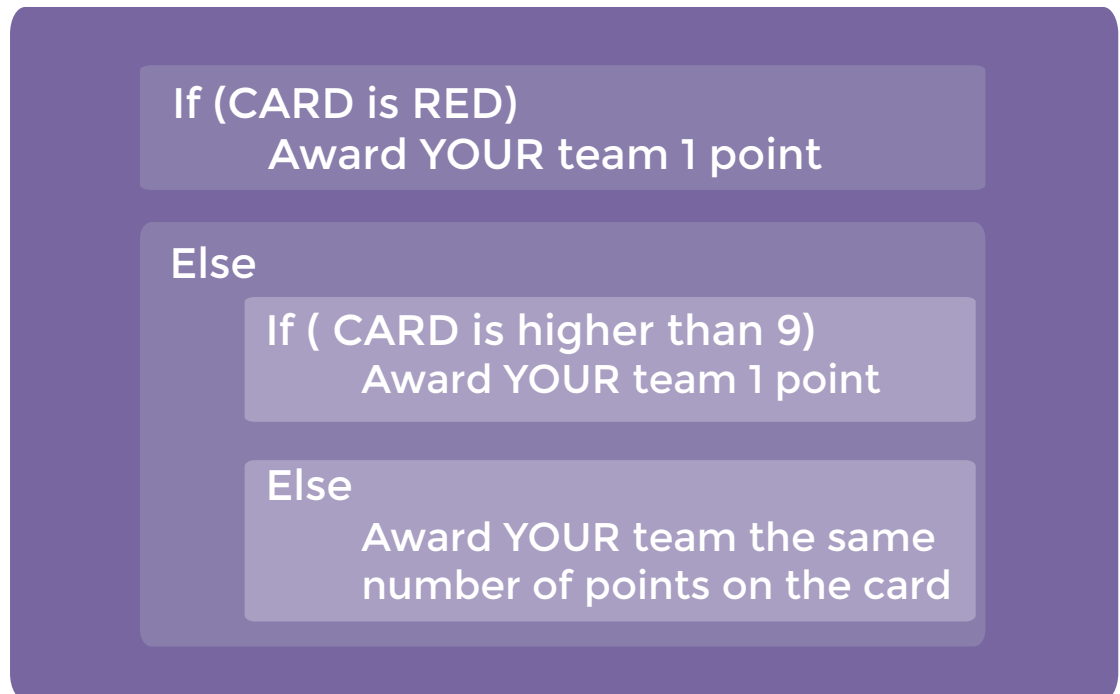
> **If (CARD is RED)**
>   Award YOUR team 1 point
>
> **Else**
>   **If (CARD is higher than 9)**
>   Award YOUR team 1 point
>
>   **Else**
>   Award YOUR team the same number of points on the card

This program has you choose a card. If the card is red, your team gets a point. Else, the card must be black. If your black card is higher than 9, then the other team gets a point, else your card must be black and lower than or equal to 9, and you get as many points as are on your card.

Sample program from above as pseudocode
(like code, but in no particular language)

```
If (card.color == RED) {
      points.yours = points.yours + 1;
}

Else {
      If ( card.value > 9) {
            points.other = points.other + 1;
      }

      Else {
            points.yours = points.yours + card.value;
      }
}
```
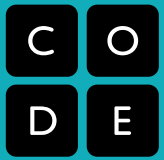
Conditionals with Cards
Intermediate Assessment Activity

C O D E

Look at the program below.

The steps below show each team taking turns to play the Conditionals Game. See if you can figure out what happens for each draw. Write down the score during each round along the way. After three rounds, circle the winner.

If (CARD is lower than 5)

> If (CARD is BLACK)
>> Award YOUR team the same number of points on the card
>
> Else
>> Award OTHER team 1 point

Else
> If (CARD is HEARTS)
>> Award YOUR team 1 point

Here's how the game went:

	TEAM #1	END OF ROUND SCORE	TEAM #2	END OF ROUND SCORE
		0 ____		0 ____
ROUND #1	3 ♠	____	7 ♥	____
ROUND #2	4 ♥	____	4 ♣	____
ROUND #3	9 ♣	____	5 ♦	____