Checkout Revisited

- Not worrying about tax and coupons, redo the checkout problem so it will calculate the total cost for buying a number of items until there are no more items. Then it allows the person to pay and gives them change.

Handle one item

- Find out which item
- Find out cost
- Tack this on to the bill
- Announce bill so far
Handle one item

```
ask What item are you buying? and wait
ask Item 1 to answer
ask What is its price? and wait
change bill by answer
say Join Your bill so far is $ BILL for 5 secs
```

Many Items

```
ask What item are you buying? and wait
cat Item 1 to answer
ask What is its price? and wait
change bill by answer
say Join Your bill so far is $ BILL for 5 secs
```

What do you use in programming to make something happen many times?

Loop

What kind of loop?

Many Items

```
ask What item are you buying? and wait
cat Item 1 to answer
ask What is its price? and wait
change bill by answer
say Join Your bill so far is $ BILL for 5 secs
```

Many Items

```
ask What item are you buying? and wait
cat Item 1 to answer
ask What is its price? and wait
change bill by answer
say Join Your bill so far is $ BILL for 5 secs
```

What kind of loop?

Should we stop asking for items eventually?
Many Items

What kind of loop?
Should we stop asking for items eventually?
Yes - so it cannot be a Forever loop

Many Items

What kind of loop?
Do we know exactly how many items there are?

Many Items

What kind of loop?
Do we know exactly how many items there are?
No, so it cannot be a Repeat # loop

Many Items

What kind of loop?
So, it must be a Repeat Until loop

Many Items

So, it must be a Repeat Until loop
Scratch Lesson 5B

Indicating We are Done

How should we have the cashier tell us there are no more items? Lets have them type in DONE.

Indicating We are Done

How should we have the cashier tell us there are no more items? Lets have them type in DONE.

Sentinel

How should we have the cashier tell us there are no more items? Lets have them type in DONE. In this code, DONE will be the sentinel value.

Sentinel

DONE is the sentinel value.

A special value used to stop some activity during programming is called a "flag" or "sentinel".
The variable that the sentinel value will end up in is called the "sentinel variable".

**Sentinel**

- repeat until [DONE]
  - ask [What item are you buying center DON'T when no more] and wait
  - set [Item] to [answer]
  - ask [What is its price] and wait
  - change [Bill] by [answer]
  - say [Join Your bill so far is $] for 3 sec

**DONE** is the sentinel value. In this code, [Item] is the sentinel variable.

**Ending Condition**

So what should we use as the condition for the repeat until loop?

**Rest of Code**

Let us do a couple final things like start out with setting the [Bill] to 0 before we handle the items (prior to loop) and get the cash and announce the change after all the items have been handled (after the loop).
Rest of Code

- Set bill to 0
- Get Cash, Give Change
- Sentinel loop to handle all items until DONE entered

Oddness

- When we entered DONE it still asked for the cost and did other stuff.
- Why?

Oddness

- When we entered DONE it still asked for the cost and did other stuff.
- Why?
- Remember, once in the body of any loop, all the code will be done. It will never stop in the middle.

Oddness

- When we entered DONE it still asked for the cost and did other stuff.
- Remember, once in the body of any loop, all the code will be done. It will never stop in the middle.
- In this case, it asked for the item in the loop and got DONE at the time - so it finished the rest of the code in the loop body.
Oddness

- In this case, it asked for the item in the loop and got DONE at the time - so it finished the rest of the code in the loop body.

Fix

- There is a clever and useful way to fix this that can and should be used in any sentinel loop.

- You can ask for the first item before the loop, and ask for all the remaining items right before you loop around (bottom of body).
Fix
- You can ask for the first item before the loop, and ask for all the remaining items right before you loop around (bottom of body).

Better Version
- Using correct sentinel loop

General Sentinel Loop
Anytime you want code to continue looping until a special value (sentinelVALUE) is entered and placed into a variable (SentinelVariable), you can structure your code as you see here.

Example Sentinel Loop
Process the grades for students in a class until the name FAKE is entered as the student’s name.

Alternative Sentinel Loop
If you do not like repeating the same ASKs in two places, you can also use an IF statement, with a not condition in the body of the loop to get the same behavior.

Availability of Slides
Go to nbcs.rutgers.edu/~jt to see the powerpoint slides and/or podcasts for this lecture.