Flowcharts

• One way to organize how your simulation will work is to use pseudocode.
• Another way is to use a flowchart, which is a visual depiction of the events in the simulation.
Flowchart Symbols

- Different symbols in represent different types of actions in flowcharts.
  - Start or end of program
  - Perform a mathematical calculation
  - Get input from user or display output to user
  - Ask a yes/no question
  - Connect parts of the program that won’t fit nicely on the page
  - The arrows show what step to do next
A Simple Example

• For an example, we’ll simulate a simple game.
• Alice and Bob will take turns flipping a coin. Alice goes first. If she gets heads, she wins and the game is over. If she gets tails, then Bob gets a turn. He flips the coin. If he gets heads, he wins and the game is over. If he gets tails, Alice goes again. The game continues with Alice and Bob alternating who flips the coin until one of them gets heads on a coin flip. Our job is to count how many times the coin is flipped to get a winner (but we don’t care who wins).
Pseudocode

Set number of flips = 0.
Repeat until somebody gets heads on a flip
  If Alice gets heads
    She wins.
    Increase number of flips by 1
    Output number of flips
    End simulation
  Otherwise
    Increase number of flips by 1
    If Bob gets heads
      He wins
      increase number of flips by 1
      Output number of flips
      End simulation
    Otherwise
      Increase number of flips by 1
    End simulation
Flowchart (Page 1)

Begin

Set number of flips to 0

Did Alice get heads?

Yes

Increase number of flips by 1

No

Increase number of flips by 1

(Note that if we reach this we go to the matching connector with the same letter, which in this case is on the next slide)

Output number of flips

End
Did Bob get heads?

- If No: Increase number of flips by 1
- If Yes: Increase number of flips by 1

Output number of flips
Repetition

- Notice that the repetition was accomplished in the flowchart by simply connecting the arrows back to the appropriate spot, but there is no explicit symbol for it.