

INFO1103: Introduction to Programming

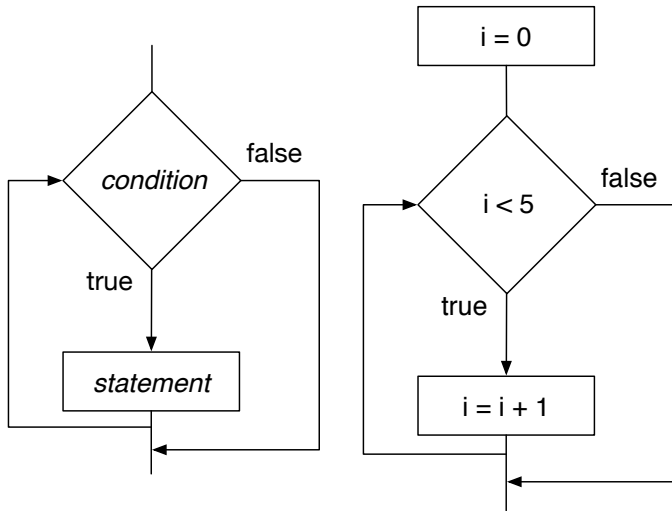
School of Information Technologies, University of Sydney



Lecture 8: More on loops, Software design process

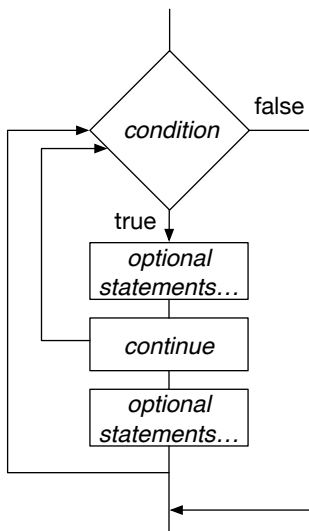
continue; Gathering requirements

Recall the while loop

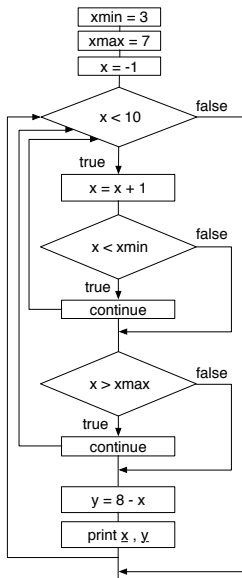


i	

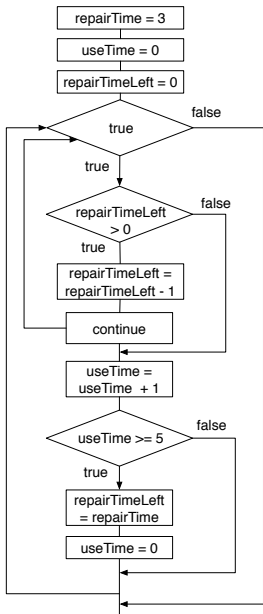
- `continue` is a special reserved word
- When used in loops, it means “skip the rest of this iteration and go on to the next one”
- It is only allowed inside the body of a loop.



Example with continue

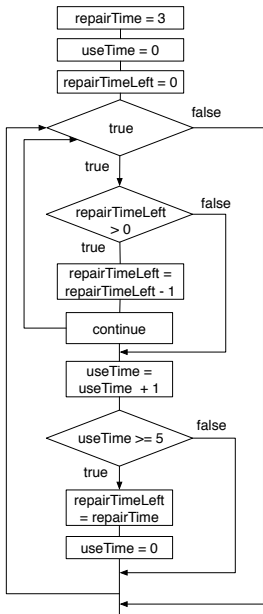
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Example with continue



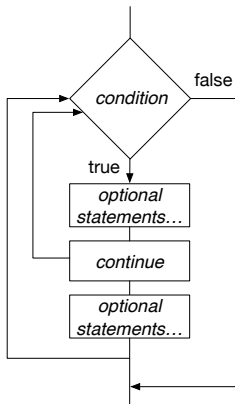
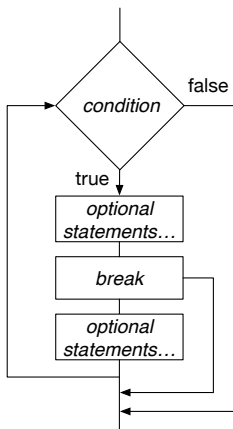
useTime	repairTime	repairTimeLeft

Example with continue



useTime	repairTime	repairTimeLeft

while loop with break and continue



Control flow within loops

- if the `break` statement is executed then exit the loop
- if the `continue` statement is executed then operation of the loop goes back to the beginning of the loop

Code trace: break and continue — example

```
1 public class Continuing {
2     public static void main(String[] args) {
3         int x = 4;
4         int y = 20;
5         while (x < y) {
6             x++;
7             if (x % 2 == 0) {
8                 continue;
9             }
10            System.out.println("x = " + x);
11            if (x == 13) {
12                break;
13            }
14        }
15        System.out.println("All done!");
16    }
17 }
```

```
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```

```
~> javac Continuing.java
~> java Continuing
x = 5
x = 7
x = 9
x = 11
x = 13
All done!
```

What would it print out if the increment of x were moved just after the current line 7?

Software design process

Building a solution from scratch

When a player receives the ball they can: dribble and/or step. If the ball has not been dribbled, the player can dribble at most once. If the player has not taken a step, the player can step once.

One of these actions will take one second of time. If player holds ball for 5 seconds or more they will stop. Your program will display the time passed and the amount of dribbling and stepping that was done.

Gather requirements information from the above description

Requirements

When a player receives the ball they can: dribble and/or step. If the ball has not been dribbled, the player can dribble at most once. If the player has not taken a step, the player can step once.

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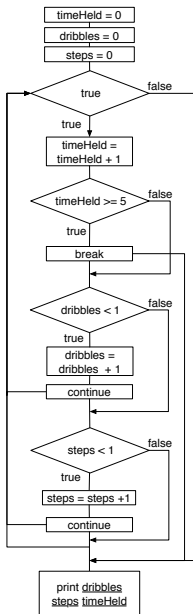
What is the output?

What information needs to be stored?

What is being processed/updated?

What is the input?

Simple Basketball rules



timeHeld	dribbles	steps

When a player receives the ball they choose an action: dribble, step, pass or shoot. One of these actions will cost the team player one second of time. Player can dribble at most one, otherwise they stop. Player can step at most once, otherwise they stop. If player holds ball for 5 seconds or more they will stop. If player passes or shoots, they will stop. Your program will repeatedly take a player choice as input and perform the action until they stop. The program will display the last action taken and time passed.

Breakdown into requirements

Extract info about the useful parts

Extract info about the useful parts

- repeatedly get input of an action
- action is one of: dribble, step, pass or shoot
- each action takes one second
- actions have different stop conditions
- time taken is a stop condition
- display last action taken
- display time passed

What can we test?

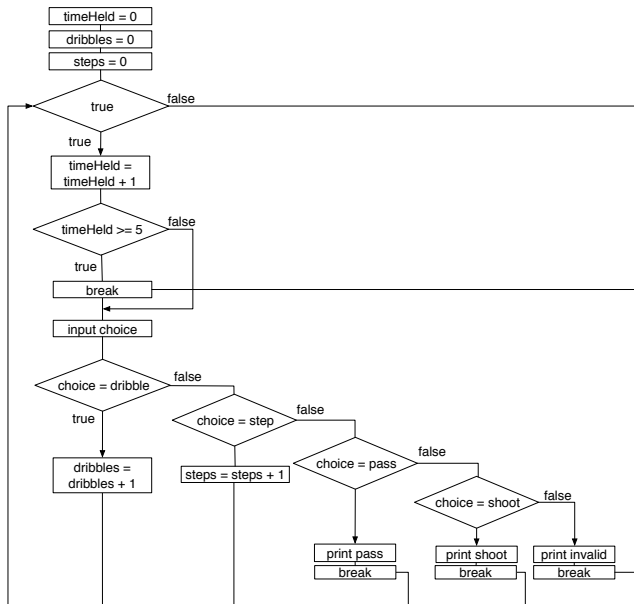
What can we test?

- *repeatedly get input of an action*
 - what kind of input is allowed? text, numbers, specific range of values
- *action is one of: dribble, step, pass or shoot*
 - action has exactly 1 of 4 values, otherwise, what do we do?
- *each action takes one second*
a variable that is a counter
 - Does it have an initial value?
 - can the seconds be fractional?
 - is there an upper limit?

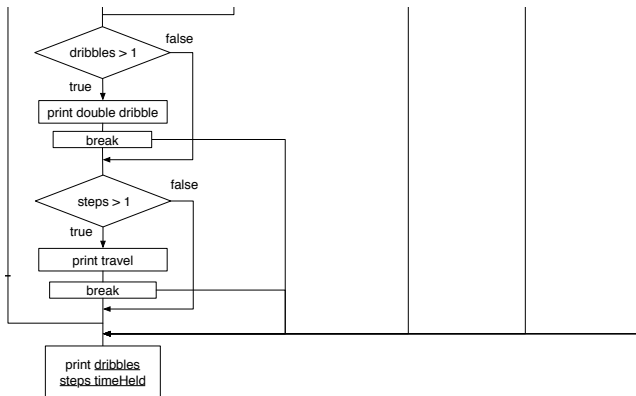
Testing more Basketball rules (cont.)

- *actions have different stop conditions*
 - what is the boolean expression for each stop condition to be **true**
 - dribble
 - step
 - pass
 - shoot
 - when should the expression be tested? i.e is there an order among them?
 - can we combine these expressions?
- *time taken is a stop condition*
 - what is the boolean expression?
 - does this take precedence over other loop control flow conditions?
- *display last action taken*
display time passed
 - what is the output format?
 - are there adjustments to the output of the final value? rounding

More Basketball rules: a sample design



More Basketball rules: a sample design (cont.)



Create test data and expected output

Test with deskcheck

Writing code should be last. Logic and syntax errors are much easier to deal with when the software design process is done correctly.