

Software Quality

Course 1

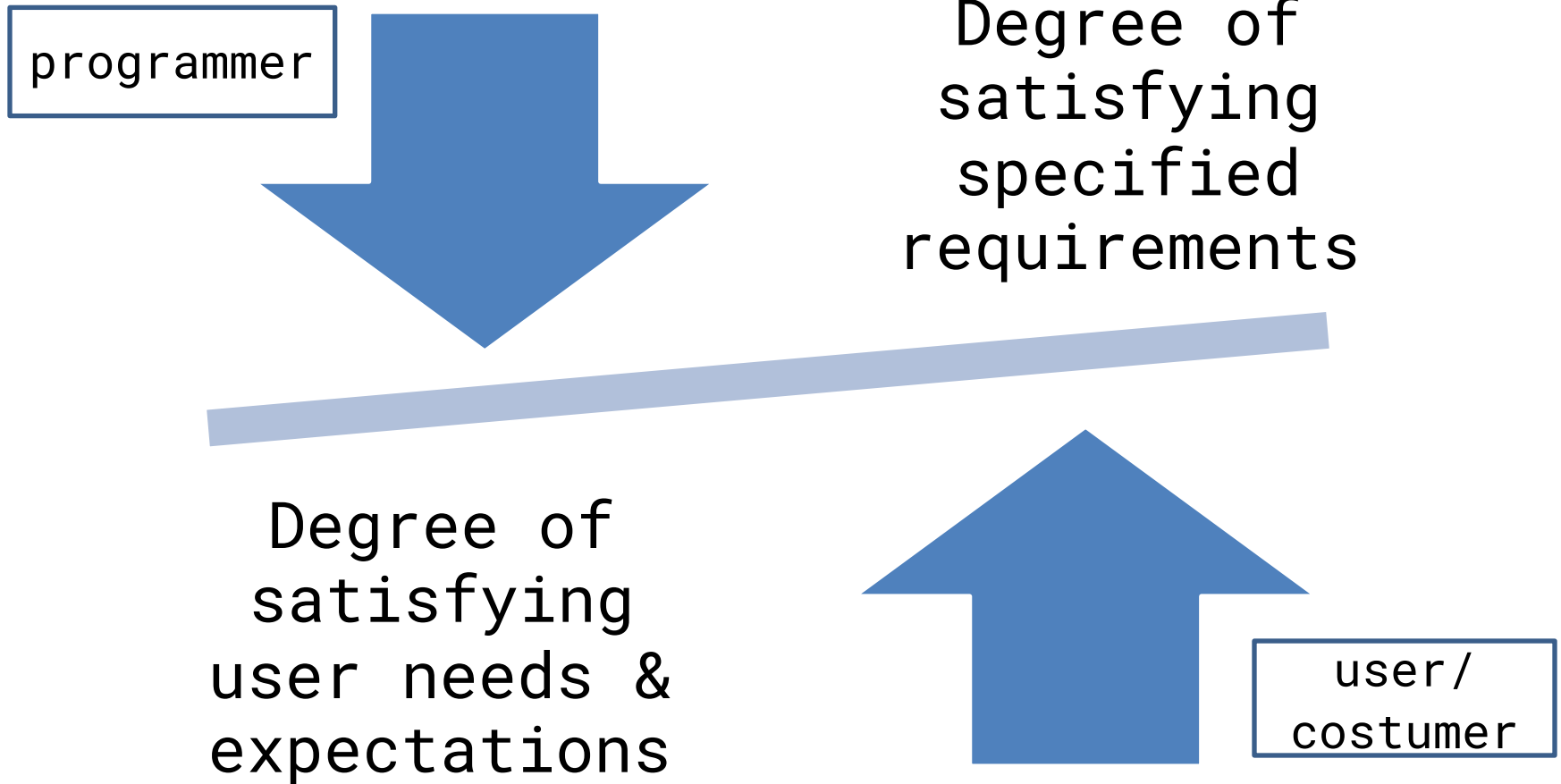
Introduction

Course info

- Course + lab
- TO DO:
 - 2 labs
 - project: SQ plan for your/other project
- Evaluation:
 - 50% written exam + 50% semester activity

[http://www.cs.ubbcluj.ro/~motogna/
SoftwareQuality.html](http://www.cs.ubbcluj.ro/~motogna/SoftwareQuality.html)

What is Software Quality?



Characteristics of SQ

External (user)

Correctness – system is free of faults in specification, design, implementation

Usability – easy to use

Efficiency – minimal use of resources

Reliability – perform required tasks in stated conditions

Integrity – prevent unauthorized or improper access

Adaptability – easy to be used in other environments

Accuracy – how well does the job

Robustness – continue to function in invalid conditions

Characteristics of SQ

Internal (developer)

Maintainability – easy to modify / extend

Flexibility – easy to modify for other purposes

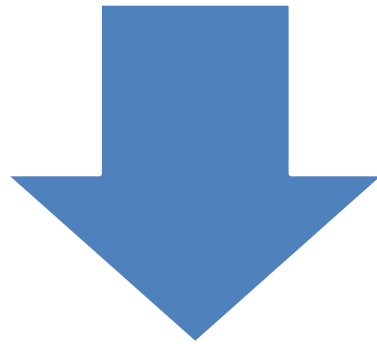
Portability – easy to use on different platforms, environments

Reusability – easy to be reused in other systems

Readability – easy to read and understand

Testability – easy to verify if it meets the requirements

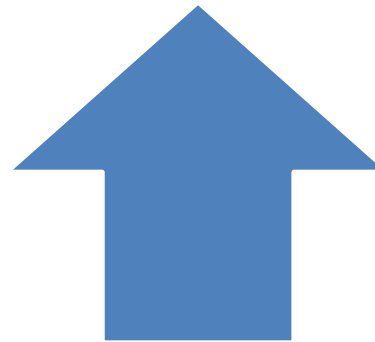
Understandability – coherence of a system



External



Internal



Dependency between external characteristics

(S. McConnell – Code Complete)

	Correct.	Usab.	Effic.	Rel.	Integ.	Adapt.	Acc.	Robust.
Correct.	↑		↑	↑			↑	↓
Usability		↑				↑	↑	
Efficiency	↓		↑	↓	↓	↓	↓	
Reliability	↑			↑	↑		↑	↓
Integrity			↓	↑	↑			
Adaptability					↓	↑		↑
Accuracy	↑		↓	↑		↓	↑	↓
Robustness	↓	↑	↓	↓	↓	↑	↓	↑

Facts- statistics

- Fact: improving quality reduces development costs
- Stats:
 - Biggest (all resources) activity in software development is debugging and correcting code

Stats

- NASA
 - 50 projects/ 400 work-years/ 3 mil lines of code
 - “ increased quality assurance decreased error rate, didn’t increase overall development costs”
- IBM
 - “less defects – shortest development projects”
 - “removing errors – most expensive and time-consuming activity”

Stats

- Experiment (1985)
 - 166 programmers – same specification => programs \approx 220 lines + \approx 5 hours
 - “less errors – average time”