

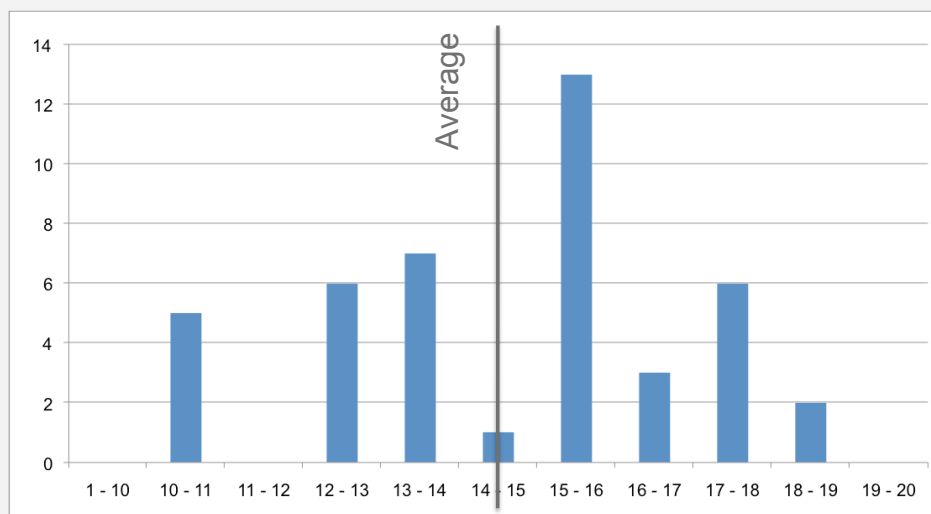


Discussion SE Exercise 5

Dustin Wüest and Cédric Jeanneret

Requirements Engineering Research Group
Department of Informatics
University of Zurich

SE Exercise 5 Results





Ex 2.1: Contracts

Purpose

- Define a contract for the Queue interface

Criteria

- No implementation assumptions (-0.25)
- Correctness (based on comments content)
 - Esp. ordering (-0.5)



Ex 2.1: Contracts

A queue has a limited capacity

```
/**
 * ...
 * @inv size <= capacity
 * && capacity > 0
 * && size >= 0
 * && !(isFull() && isEmpty())
 */
public class Queue<E>
```



Ex 2.1: Contracts

```
/**
 * ...
 * @return true if the queue is full
 *
 * @pre -
 * @post result == (size == capacity)
 */
public boolean isFull() {...}

/**
 * ...
 * @return true if the queue is empty
 *
 * @pre -
 * @post result == (size == 0)
 */
public boolean isEmpty() {...}
```



Ex 2.1: Contracts

A queue does not accept null elements

```
/**
 * ...
 * @pre !isEmpty()
 * @post result != null && size == (size@pre - 1)
 */
public E dequeue() {...}

/**
 * ...
 * @pre !isFull() && element != null
 * @post size == (size@pre + 1) && !isEmpty()
 */
public void enqueue(E element) {...}
```



Ex 2.2: Function Points

Unadjusted Function Points



Transactional functions:

- 1 data input (complex, 6 UFP)
 - 6 data element types
 - 3 file types referenced

Data functions:

- 3 internal logical files (simple, 7 UFP)
 - 1 record element type for each of them
 - Less than 20 data element types for each of them

Total: 27 UFP



Ex 2.2: Function Points

Total Degree of Influence



| Factor | Value |
|-----------------------------|-----------|
| Data Communication | 3 |
| Distributed data processing | 3 |
| Performance | 3 |
| Heavily used configuration | 3 |
| Transaction rate | 3 |
| Online data entry | 3 |
| End user efficiency | 5 |
| Online update | 3 |
| Complex processing | 0 |
| Reusability | 5 |
| Installation ease | 3 |
| Operational ease | 5 |
| Multiple sites | 0 |
| Facilitate change | 5 |
| Total (TDI) | 44 |



Ex 2.2: Function Points



$$\text{VAF} = 0.65 + 0.01 \times \text{TDI} = 1.09$$

$$\text{FP} = \text{UFP} \times \text{VAF} = 29.43$$

The average effort required for a function point is strongly dependent on the project and the company.



Ex 2.3: Cocomo II

a) Choice of the project leader



| | IT4U | ASIT |
|--|--------|--------|
| <i>Scale Drivers</i> | | |
| Precedence | Lower | Higher |
| Team Cohesion | Higher | Lower |
| <i>Cost Drivers (Effort Multipliers)</i> | | |
| Personnel Continuity | Higher | Lower |
| Application Experience | Lower | Higher |

Increase Effort

Decrease Effort



Ex 2.3: Cocomo II

b) Choice of the dev. location



| | IT4U | ITIndia |
|---|--------|---|
| <i>Scale Drivers</i> | | |
| Team Cohesion | Higher | Lower Various culture among stakeholders |
| <i>Cost Drivers (Effort Multipliers)</i> | | |
| Platform Experience | Lower | Higher |
| Language and Tool Experience | Lower | Higher |
| Team Co-location and Communications Support | Higher | Lower |

Increase Effort

Decrease Effort



Ex 2.3: Cocomo II

c) Flexibility



Need for software conformance with pre-established requirements

The registration process is defined and cannot be changed.

Need for software conformance with external interface specifications

The system shall delegate the authentication of users to an existing service.

Premium on early completion

The department's head wants the system to be ready for the beginning of the next semester.



Ex 2.3: Cocomo II

d) Improved Reuse

Cocomo II effort estimation:

$$E = 2.45 \cdot A \cdot KSLOC^B$$

with

$$A = \prod_{i=1}^{17} EM_i \quad \left| \quad \begin{aligned} B &= 1.01 + \sum_{i=1}^5 SF_i \\ B &= 1.153 \end{aligned} \right.$$

$$A_0 = 1$$

$$A_1 = 1.29$$



Ex 2.3: Cocomo II

d) Improved Reuse

$$E_0 = E_1$$

$$A_0 \cdot KSLOC_0^B = A_1 \cdot KSLOC_1^B$$

$$A_0 \cdot KSLOC_0^B = A_1 \cdot ((1-x) \cdot KSLOC_0)^B$$

$$\frac{(1-x)^B KSLOC_0^B}{KSLOC_0^B} = \frac{A_0}{A_1}$$

$$1-x = \left(\frac{A_0}{A_1}\right)^{1/B}$$

$$x = 1 - \left(\frac{A_0}{A_1}\right)^{1/B}$$

$$x = 0.1981$$



Ex 2.3: Cocomo II

e) *Conditions*

Need of historical or industry data for similar projects

Calibration for the company



Ex 2.4: Risk Estimation

Purpose

- Identify risks against the BlascoArt **project** and estimate the risk exposure
 - Possible loss of: time, money, control, understanding, quality
 - Types: technology, people, organizational, tools, requirements, estimation
- Manage the risk by
 - Avoiding it
 - Transferring it
 - Assuming and reducing it
 - Preparing for the worst (“contingency plans”)

Evaluation

- Risk Identification (2 points)
- Risk exposure evaluation (1 point) [Exposure = Probability x Impact]
- Corrective measure (1 point)



Ex 2.4: Risk Estimation

Example



A key staff member is not available at a critical time
Loss of time (and money)

Estimation

- Probability: 4
- Impact: 5
- Exposure: $4 \times 5 = 20$

Measure

- Make sure that team members understand each other's job (risk reduction)