

# Quality Management of Software and Systems (WS 09/10)

## Problem Set 7

Thursday, February 18<sup>th</sup>, 2010

### Problem 1: Types of reusability

- a) Assume that in your company an old Cobol-Program for salary calculations exists. Now, the management has decided to develop a new program. Therefore, old calculation routines as well as old control routines shall be reused, if possible. Which sort of reuse is used? Which methods can be used?
- b) During an acquisition the company gains the rights of a word processing program, available in version 6.0. They decide to develop a new version 7.0 with enhanced functionality and an improved user interface. Which type of reuse can and should be used here?
- c) Additionally, the word processor shall be incorporated in a browser in a less complex form and with another user interface. Which type of reuse can and should be used here?
- d) Which other types of reuse do you know? What can be said about the usage of these types?

### Problem 2: Technical Concepts of Reuse

- a) Which technical concept of reusability is represented by a mathematical Ada library? Which problems arise with this concept?
- b) Which technical concept of reusability is represented by a collection of different data structures (e.g. queue, list and stack)? Which problems arise with this concept?
- c) Which technical concept of reusability is represented by a class library in C++? Which problems were solved and where are limitations?

### Problem 3: Organizational Activities

In your company reusability was ignored until now. Recently, you have heard about the advantages of reuse and therefore you would like to implement it. Which organizational activities have to be taken, to comprehensively and successfully introduce reuse?

### Problem 4: Factors for Success of Reusability

During the implementation of reuse within your company, you encounter several problems:

- a) Which possible factors leading to a failure during the reuse of components do you know?
- b) Which preconditions are necessary for the acceptance and exercise of reuse?

### Problem 5: Component Evaluation

Compare the following two C++ functions, calculating the square root. Which one is better and suited for reuse? List the appropriate arguments.

// C++ - Function 1

```
void sqrt(int x)
{
    int I;
    I = 0;
    while ((i * i) < x) I ++;
    cout << "stays between " << i-1 << "and" << i << endl;
}
```

// C++ - Function 2

```
int squareRoot(int number)
{
    /* The function "squareRoot" of a given number, calculates
    the greatest number, which elevated at the power of two,
    is less or equal than this number. The following applies
    when calculating the square root of a number: Root^2 <=
    givenNumber < (Root+1)^2. If the result of calculating
    this function is less than 0, it returns "-1" (A negative
    number cannot be the result of calculating a square root).

    Author: Helmut Balzert, Date: 21.08.1997, Version: 1.0 */

    /* input parameters: int number. Square root will be cal-
    culated for this number.
    Output parameters: int squareRoot. Result of calculat-
    ing the square root of "number". It returns -1 if square
    root is less than 0 (Failure case) */

    // In case number is less than 0, return failure

    If (number < 0) return -1

    // root should be initialized with 0. If root is = 0 then
    it is also correct

    int root = 0;

    //Count up until root is calculated

    while ((root * root) < number) root = root+1;

    return root;
}
```