



Algorithmen und Datenstrukturen (Informatik III)

WS1999/2000 – Übungsblatt 9

Abgabetermin: 26. Januar 2000

Aufgabe 1. *Proof Obligations*

Überprüfen Sie *Erfüllbarkeit* und *Erfüllung* der Spezifikation des Raumzugangssystems (Aufgabe 1 / Übungsblatt 7).

Aufgabe 2. *Date-Datentyp*

Spezifizieren Sie ein Datentyp-Modul *Datentyp* (Fortsetzung von Aufgabe 3 / Übungsblatt 8), in dem für jedes Datum mindestens ein Konstruktor bzw. Modifikator, die Observatoren *Tag*, *Monat*, *Jahr* und die Operationen *nachfolgenderTag*, *vorausgehenderTag* definiert werden sollen.

Aufgabe 3. *rekursive Listenspezifikation (ohne Pointer)*

Ändern Sie die rekursive Listenspezifikation der Vorlesung so ab, daß die Operation *DeleteElement*(*x* : *X*) lediglich die Vielfachheit der Einträge mit Wert *x* um Eins dekrementiert und nicht alle Einträge mit Wert *x* löscht.

Aufgabe 4. *rekursive Listenspezifikation (ohne Pointer) - Forts.*

Wie muß eine Spezifikation aussehen, die das Löschen des *k*-ten Eintrages mit Wert *x* (falls vorhanden) vorschreibt?

Aufgabe 5. *Greedy-Algorithmen*

Schreiben Sie eine C++-Funktion *Wechselgeld*, die beliebige Geldbeträge (DM und Pf) mit möglichst wenigen Geldstücken „auszahlt“. (Gehen Sie dabei von unbeschränkten Vorräten der Münzen des deutschen Währungssystems aus.)

Date: Sat, 15 Jan 2000 22:21:16 PST

From: "Peter G. Neumann" <neumann@csl.sri.com>

Subject: More on Pentagon satellite data outage (RISKS-20.72)

We noted in RISKS-20.72 that the Pentagon satellite intelligence system was

unable to process data for 2.5 hours after the midnight GMT Y2K rollover. Apparently the situation was much worse than initially realized. UPI reported on 12 Jan 2000 that the problem was actually self-inflicted, resulting from a misguided supposedly preventive software patch in a sensitive NRO intelligence program called Talent Keyhole at Fort Belvoir. For the next few days, there was only a trickle of data from 5 satellites.

Date: Wed, 12 Jan 2000 12:04:39 +0100
From: Debora Weber-Wulff <weberwu@tfh-berlin.de>
Subject: Berlin Fire Department with Y2K Problem?

There has been heated debate in the Berlin newspapers about the fire department's computer problems over New Year's. It seems that just after midnight the dispatching systems broke, but they broke in an unexpected way: they told the dispatchers that an alarm had been given to a fire station, when in reality the fire station did not receive the alarm, and kept playing cards and wondering why there were no fires this nice New Year's Eve. [This is in itself a very hard to avoid security risk.] At one point an exasperated police car drove to a fire station, which was just around the corner to ask if they needed an engraved invitation or what?!

The systems also logged fire engines as being somewhere in use when they were actually sitting in the fire house, and thus tried to alarm fire engines that were further away from the fire.

There has been lots of finger-pointing. The systems were "Y2K-secure" because they were tested for this 2 weeks ago. [Gosh, I didn't realize that someone had found out how to prove by test that software functions properly! -dww] The chief fire fighter had to be called in at about 1.30 am to figure out what to do, eventually falling back on very old equipment: people, paper and pencil.

The blame has been put on the massive number of calls to the fire department during the night, which had overloaded the system. Maybe I ought to invest in a second fire extinguisher...

Some on-line articles:

<http://www.tagesspiegel.de/archiv/2000/01/04/ak-be-kr-13983.html>

<http://www.tagesspiegel.de/archiv/2000/01/06/ak-be-st-24269.html>

Interesting too the article in August 1999

<http://www.tagesspiegel.de/archiv/1999/08/05/ak-be-st-23279.html>

where an official says that the fire department is just spreading panic by saying that they will be having problems on New Year's Eve...

Prof. Dr. Debora Weber-Wulff, Technische Fachhochschule Berlin