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Fachbereich 7

MATHEMATIK

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Algorithmen und Datenstrukturen (Informatik III)

WS1999/2000 – Übungsblatt 7

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Aufgabe 1. *Spezifikation mit Hilfe von Mengen*

Spezifizieren Sie formal einen Datentyp und die Operationen `ENTER, EXIT, IS_PRESENT, IS_EMPTY` für ein Raumzugangssystem. Geben Sie den Anfangsstatus und die Invarianten an. Vergessen Sie bitte nicht, daß in einem sicherheitskritischen Raum nur berechtigte Personen Eintritt erlangen dürfen und daß die Menge der zutrittsberechtigten Personen vergrößert, verkleinert, ... werden können muß (Welche Operationen? Formale Spezifikation in VDM!).

Aufgabe 2. *ADT-Manager*

Ändern Sie die Spezifikation des Datentyp-Managers `ManageQueues` so ab, daß Queues verschiedener Maximallänge erzeugt und bearbeitet werden können.

Aufgabe 3. *Spezifikation einer Homework-Datenbank*

Spezifizieren Sie die Operationen

```
Submit(std : Student) -- a homework
```

und

```
Remove(std : Student) -- a student from class
```

aus Kapitel 1.9 der Vorlesung.

Aufgabe 4. *Maps*

Definieren Sie mit Hilfe der Mengenschreibweise die Operationen

$$s \lhd m, s \lhd\!\!\!\cdot\, m, s \rhd m, s \rhd\!\!\!\cdot\, m$$

für $s \in D\text{-}\mathsf{set}$ und $m \in D \xrightarrow{m} R$.

1999

July: Six-month projections fail.

July 1: FY 2000 begins in 46 U.S. states.

August 22: Global Positioning System (GPS) rolls over from week 1024 to week 0001.

September 1: FY 2000 begins in the state of Texas.

September 9: "9/9/99": default "nonsense" date.

September 23: 99 days to year 2000.

October: Three-month projections fail.

October 1: FY 2000 starts in the states of Alabama and Michigan.

October 1: U.S. federal government's FY 2000 starts.

October 3: 90-day projections fail.

December: One-month projections fail; 12/99 might be a "signal"; electrical generators sell out; hoarding begins.

December 2: 30-day projections fail.

December 31: Sometimes used as "Never Expires" date (IBM tapes are marked 99365—*all* could expire today); Blue Friday: Largest one-day sell-off in stock-market history; long lines at ATM machines; support for much software might cease after today, 1999/99/99: a really "nonsense" date.

2000

January 1: Black Saturday Computer passwords expire, lock ing administrators out of systems; noncompliant systems (fire alarms, heating systems, power grids, telephone routing and billing, medical care, military, air traffic, Internet, and financial exchanges) fail; incorrect bills are sent out; manual paperwork begins; unemployment drops; supply chains begin disruption; first casualties occur; litigation begins. Still twentieth century and second millennium.

January 3, Monday: First business day of the year 2000 in the U.S.

January 4, Tuesday: First business day of the year 2000 in the U.K.

January 8, Saturday: The first "We Survived" party is held.

February 1: The second "We Survived" party is held.

February 29, Tuesday: Some major software packages do not think this date exists. Some say that some PDP-11 computers will not boot after this date.

March 1: Some leap-year errors might not have appeared yesterday.

2001

January 1: Third millennium and twenty-first century start.

February 29: Will not exist.

2002

Transition to the Euro is completed within contiguous Europe.

2002

January 1: Burroughs Unisys A Series system date fails?

2005

Some really old versions of Unix (e.g., 16-bit BSD) die this year?

2009

FAA finishes its Year-2000 preparations (U.S.).

2020

January 1: Systems still using 1920 as a pivot year fail.

January 1: Macintosh (System 6.0.4+) Date & Time Control Panel can no longer set the current date.

2023

December 23, Sunday: End of the world, according to the Mayan calendar.

2030

January 1: Systems still using 1930 as a pivot year fail.

2036

January 1: Burroughs Unisys A Series system date fails?

February 6: 2^{32} seconds from January 1, 1900.

2038

January 19: Unix: 2^{31} seconds from January 1, 1970.

2040

February 6: At 06:28:16, old Macs' longword seconds from January 1, 1904, overflow.

2042

September 17: IBM 370 TOD clock overflows.

2044

January 1: MS-DOS: 2^8 years from 1980, setting the most significant bit (MSB). Signed variables using this get a negative date.

2046

January 1: Amiga system date failure.

2046

June 8: Some Unix password aging fails; 64^2 weeks from 1970.

2049

December 31: Microsoft Project 95 limit.

2078

December 31: Excel 7.0: The Last Day.

2079

June 6: 2^{16} days from January 1, 1900.

2080

January 1: MS-DOS file dates, displayed with two-digit years, are now ambiguous.

2100

January 1: Y2.1K: most current PC BIOSes run out of dates; MS-DOS DIR renders the file-date years 2100 through 2107 as 99.

2106

February 7: Unix: 2^{32} seconds from January 1, 1970; time overflows at 06:28:16.

2108

January 1: MS-DOS: 2^7 years from 1980; file date overflows.

2738

November 28: Approximate day of A.D. 1 million.

4338

November 28: Cobol-85 integer day 1,000,000 exceeds six-digit field 9999: HTTP caching fails.

10000

January 1: Y10K: four-digit years fail.

29602

January 1: Microsoft Windows NT File System (NTFS) fails.

29940

New Macs' signed 64-bit time fails (has been OK since 30,081 B.C.).

31086

July 31: Internal Digital Equipment VMS time fails at 02:48:05.47.

60056

Win32 64-bit time fails (started from January 1, 1601).