
Pitfalls in Euro Testing

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Managing Director of Systems Modelling Limited since 1981. His current projects are consulting and auditing I.T. projects for information system conversion to the euro, the single European currency. He is an approved software tester to the BASDA standard for EMU compliance, a Fellow of the Irish Computer Society, a member of the Institute of Business Analysts and Consultants, an Expert Advisor to the European Commission, and contributed to the national Euro Business Awareness Campaign of Ireland. A certified TickIT ISO9000 auditor, he promotes software development process improvement using the Personal Software Process. He is a frequent speaker at international conferences on practical I.T. approaches to the Euro single currency changeover. His book "Managing the Euro in Information Systems; Strategies for Successful Changeover" was published by Addison Wesley in August 1999, ISBN 0-201-60482-5.

From 1997 to 1999 his focus was writing articles, speaking internationally, consulting, and auditing Year 2000(Y2K) projects. He contributes to I.T. training courses in the Irish Management Institute, lectured in computer applications at the Management Science School of the Department of Statistics in Trinity College Dublin, and is involved in the TRINET project to provide remote regions with access to the world-wide Internet via low-earth-orbiting satellites. His background is in industrial quality control and operations research applications.

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Pitfalls in Euro Software Testing

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Testing, testing...

- Test the tools
- Test the environment
- Test the user requirements
- Scattergun versus scalpel

Euro conversion characteristics

- “It’s just multiplying, right?”
- Avoidable rounding errors
- Inevitable rounding errors
 - converting price points
 - psychological / convenient
 - detail and total reconciliations
- Auditability

Testing standards

- “Euro-compliance” standards
- BASDA, Afnor (France), Certco (Germany) (cf ISO/DIN 12119)
- Reduction of complex attributes to checklists in magazine package surveys
- User companies own requirements in addition to mere legal compliance

Remember these?

- **Equivalence partitioning**
 - to discover classes of errors
 - is the conversion rate correct?
 - What happens at rounding point?
- **Boundary value analysis**
 - the extreme values for each equivalence partition
 - look at input and output domains

EC Regulation 1103/97 art.4

- *The conversion rates ... one euro expressed in terms of each of the national currencies ... Inverse rates derived from the conversion rates shall not be used.*
- But many packages express exchange rates as the amount of foreign currency equivalent to one unit of base and multiplication would require the use of an inverse rate
- *They shall be adopted with six significant figures ... must not be rounded or truncated when making conversions.*
- But these packages only store rates to 2 or 4 d.p.
- Also the origin of the myth “all figures must be stored to 6dp”
- **Example test: Convert IEP 787,5640.00 to EUR**
- **Detect the use of rounded, truncated, inverse rates with 7dp**

EC Regulation 1103/97 art.4

- “Triangulation”
- *Monetary amounts to be converted from one national currency unit into another shall first be converted into a monetary amount expressed in the euro unit,*
- But many packages use cross rates
- *which amount may be rounded to not less than three decimal places and shall then be converted into the other national currency unit.*
- Note “may”, not “must”; can get different answers!
- *No alternative method of calculation may be used, unless it produces the same result.*
- Hard to prove

Triangulation example

- Regulation allows 3 d.p. or more
- EUR 1 = IEP 0.787564 = ITL 1936.27
- **IEP 99.15 / 0.787564 = EUR 125.8945305**
- **Ambiguity:**
- **2 d.p. EUR 125.89 = ITL 243757 Wrong**
- **3 d.p. EUR 125.895 = ITL 243767 Right**
- **4 d.p. EUR 125.8945 = ITL 243766 Right**

EC Regulation 1103/97 art.5

- *... after a conversion ... the euro unit shall be rounded up or down to the nearest cent, ... national currency unit shall be rounded up or down to the nearest sub-unit ... according to national law or practice*
- *If the application of the conversion rates gives a result which is exactly half-way, the sum shall be rounded up.*
- **This gives us the boundary of our test case .. X.XX5**
- To provoke “premature rounding”, create a test case like X.XX499. Data rounding by the application math library or the database system might round that to X.XX50 (to 4 dp) which the application program then rounds up

Boundary values

- IEP 585.29 = EUR 731.1649999238
- IEP 1117.51 = EUR 1418.945000025
- EUR 1587.89 = IEP 1250.56499996
- EUR 1250.00 = IEP 984.455
- www.sysmod.com/eurocert.htm

Wrap it up (1)

- Attempt to “wrap” a NCU system
- Take a euro input, store as IEP, re-display as euro
- Integrity checks fail

| Invoice | Input € | Store £ | Output € |
|---------|-------------|-------------|----------|
| Nett | 14.00 | 11.03 | 14.01 |
| VAT | <u>2.94</u> | <u>2.32</u> | 2.95 |
| Gross | 16.94 | 13.35 | 16.95 |

Wrap it up (2)

- Attempt to “wrap” a Euro system
- Take a NCU input, store as Euro, re-display as NCU
- Other integrity checks fail

| Invoice | Input £ | Store € | Output £ |
|---------|--------------|--------------|----------|
| Line 1 | 18.00 | 22.86 | 18.00 |
| Line 2 | <u>18.00</u> | <u>22.86</u> | 18.00 |
| Total | 36.00 | 45.72 | 36.01 |

Further Information

- Systems Modelling Ltd
www.sysmod.com
- The Euro / EMU FAQs
www.sysmod.com/emu.htm
- Book description, online support
www.sysmod.com/maneuris.htm

