The Patriot Missile Failure

The American Patriot Missile was used to defend against an incoming Iraqi Scud missile. The American Patriot Missile was supposed to track the Iraqi Scud missile, but unfortunately it failed to do so because of a computation error. The missile counted time every 1/10 of a second using a 24 bit fixed point register, meaning that it only kept track of time using a variable with 24 digits. Since 1/10 in binary has an infinite binary expansion, that means that the binary value for 1/10 is only an approximation. Thus, 100 hours after the system had been booted up, the American Patriot Missile clock accumulated a significant error of 0.34 seconds off the actual time, causing the missle to fail.

The Explosion of the Ariane 5

The Ariane 5 rocket exploded just 40 seconds after lift-off. This un-intended explosion cost about 7 billion dollars in the development costs, and $500 million in the rocket itself. This error was caused due to a loss of guidance and altitude information. The rocket used a 16-bit signed integer to store a variable related in storing the horizontal speed of the rocket. A 16-bit signed integer can only store a value as high as 32767, which restricted the rockets guidance system. The failure occurred because the value that needed to be stored was greater than 32767.

The sinking of the Sleipner A offshore platform

The Sleipner A platform produces oil in gas in the North Sea. The concrete base structure for Sleipner A sprang a leak and sank, resulting in a loss of $700 million. The loss was due to insufficient strength in one of the walls that supported the structures. The insufficient strength was caused due to an inaccurate calculation that underestimated the strength of the shear stresses that the wall would need to support. If the finite element analysis has been done more carefully, then the flaw in the platform's design would have been noticed earlier before construction.