Defusing the Year 2000 Time Bomb

By Richard Pryor

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A recent report by an IT consulting firm predicted that for every dollar spent on fixing the Year 2000 problem, two dollars will be spent on litigation and other legal costs arising from the problem.

A conservative estimate is that it will cost $1.5 billion to fix the Year 2000 problem in Australia. Simple arithmetic therefore suggests a potential new legal services market in Australia worth $3 billion.

Whilst the prediction of legal costs may prove to be wide of the mark, there are many less mercenary reasons why lawyers need a basic understanding of the year 2000 problem.

About the Bug

The "Year 2000 Bug" (a.k.a. the "Millennium Bug" or the "Y2K Bug") encompasses a variety of date-related deficiencies in computer problems.

These deficiencies exist because computer programmers adopted a practice of writing computer software which recorded and processed the year in any date-related data by recording only the last two digits (ie. 1997 is recorded as '97').

The practice evolved at a time when a computer with less capacity than an average PC of today would cost millions of dollars. Computer memory and storage was very expensive and data was entered using cards punched with holes. Each card could only be punched with a finite number of holes and therefore could only record a maximum of 80 characters. In these circumstances, programmers strove to achieve every possible reduction in the amount of information required to be input into the computer. A saving of two digits on every date related item was significant.

The practice of using only two digits to record the year was continued by many programmers long after it ceased to be necessary. As a result, trillions of date-related records which use only two digits to record the year are still stored in computers and millions of computer programs are still in use which process date-related information assuming that the year will be described by only two digits.

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The consequence is that when a computer program which suffers from this deficiency is used to process a date after 31 December 1999, it literally will not know what day it is. Some computer programs will assume that a date with a year field ending '00' is a date earlier than a date in the year '99' (ie. some programs assume that '00' = 1900). Some programs will produce unreliable output and some programs will simply cease to function at all.

Date-related data is stored in and processed by computer systems used for a variety of critical operations, including interest calculations, medical records, inventory management and payroll.

Much of the recent publicity regarding Year 2000 problems suggest that system failures will not start until New Years Day in the year 2000. However, because computer systems are already being called upon to process dates beyond the year 2000, the problem has already impacted on a variety of businesses and new problems will continue to arise prior to the year 2000. For example, credit cards have been issued with an expiry date ending in '00'. These cards have been rejected by the electronic card readers operated in stores because they card readers treat the credit card as having expired in 1900.

In response to the question, "how big is the problem?, the simple answer is that all anyone knows is that the problem is BIG. Estimates by reputable consulting houses put the global rectification costs as high as $600 billion.

The uncertainty regarding the size of the problem arises from the number of factors.

The most major and alarming factor is that many companies and government agencies have not completed (or in some cases, commenced) an analysis of the impact of the problem on their computer systems.

The second factor is that some computer system users do not have access to the source code of the computer programs they use. Source code is the high level computer programming language which a trained programmer can read and decipher. It is used to create and modify computer programs. The source code version of the computer program is then translated into a low level language (sometimes called object code) which run on the computer. It is virtually impossible for a human to understand the object code or machine-readable version of a computer program. In order to protect intellectual property rights, many computer programs are only provided to the user as object code.

The third factor is that even if access to source code can be obtained, it can be extremely difficult to identify code relating to date processing within a computer program. This difficulty arises partly from the sheer size of the computer program and is exacerbated by the tendency of programmers to use obscure names to describe date related information within the computer program.

If it is assumed that the computer programs used by an organisation have 100 million lines of source code then it could take one person almost 20 years to scrutinise this source code. In theory, 20 people could complete the scrutiny in one year. However, the time which it takes to overcome the Year 2000 bug, test the program, debug it, and re-test it would be exponentially greater than the time taken to merely examine the code.

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A further factor is that the data files containing two digit year information must also be identified and modified. This will also be a major and time-consuming exercise.

Recent announcements by several large Australian companies give an indication of the order of magnitude of the problem. The Commonwealth Bank has allowed in excess of $100 million for the problem and Telstra is reported to be allowing $166 million for year 2000 rectification costs just for the 1998 financial year.

The time available to an organisation to fix its Year 2000 problems is uncertain. As noted above, some systems will falter or fail prior to 1 January 2000. There is already insufficient time left for most organisations to be able to fully test all their computer systems and ensure that they are Year 2000 compliant.

Disaster recovery

The magnitude of the task of assessing existing software has led many organisations to conclude that they should focus only on mission-critical systems and either fix those systems or replace them. A disaster recovery plan is then put in place for non-critical systems – for example, resorting to pen and paper systems.

In South Australia, the trend appears to be towards replacing deficient systems rather than attempting to fix them. However, this solution itself presents some major problems.

No major computer system can be replaced by an off-the-shelf product. Substantial modification of software is almost always necessary to fit the software functions to the particular requirements of the business.

Software development projects are almost invariably late and as many as 30 per cent of these projects are never completed. In the case of the Year 2000 projects, the project has to be completed by 31 December 1999.

Most businesses have trimmed their information processing staff to the bone and those staff are fully occupied with the day to day operations of the business. Resources are a real problem for many businesses attempting to address Year 2000 problems.

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Specific Issues

Firstly, be warned. Software which is not Year 2000 compliant continues to be marketed today.

Y2K is not just a problem for big companies. All companies face potential risk through their own systems and through the failure of systems run by other organisations on which they rely. The managers of companies have a positive obligation to ensure that Year 2000 problems are fully assessed and addressed. Failure to do so could render company directors liable.

The problem does not just afflict traditional computer systems. Processors that utilise dates are embedded in all kinds of equipment. Will you be able to preset your VCR or digital alarm for a date after 1/1/00? Or will the lifts still work in your building?

Two points worth noting are that insurance companies have indicated that they regard Year 2000 problems as an uninsurable risk and will not consider extending policies to cover it, and financiers have indicated that they will make Year 2000 compliance a precondition to lending funds. The Year 2000 problem has been publicised for many years. Participants in the information technology industry (including legal advisers) who have failed to provide appropriate advice about the issue in circumstances where they knew or ought to have known of the problem could face substantial liabilities for negligence.

On one view of the law, a competent person should always have known of the inherent deficiency of using a two digit year field, so the critical test of negligence may be whether a reasonable person ought to have anticipated that the software might be used to process dates later than 31 December 1999.

For licensors and distributors of non-compliant software, contractual terms and sales representations should be reviewed. If the contract excludes liability for bugs but includes an obligation to rectify bugs or provide a workaround, the licensor/distributor could be liable for all costs in curing the Millennium Bug or providing alternative software which is Year 2000 compliant.

If it is uncertain whether the software which is in use suffers from the Year 2000 Bug, the licence agreement and circumstances surrounding the licence negotiations must be reviewed to ascertain which of the parties is liable to pay the costs of analysing and testing the software.

Software maintenance contracts should be reviewed to assess whether the obligations expressly or impliedly extend to rectifying date-related defects.

For contractors offering to remedy software supplied by third parties, the third party licence agreements must be reviewed to ensure that confidentiality and other obligations will not be contravened by the customer if the contractor is given access to the software code.

The contractor must also ensure that the process of review and modification of the source code does not involve any inadvertent copyright infringement. It should be noted that copyright in the source code may be infringed merely by causing a copy of the code to be loaded into the memory of a computer or to be displayed on a computer screen.

Contracts governing the provision of services to rectify non-compliant software should be carefully reviewed to ensure that the various causes of delay and the consequences are clearly addressed. The obligations of the customer to permit access to source code, documentation, hardware, personnel and

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Cocktails For Christmas

There are green and cream, red, blue and black – there are lots of interesting and oddly shaped bottles with exotic names and origins. They are the liqueurs.

Some liqueurs are for drinking on their own as an aperitif or perhaps after the meal. Mostly they are the ingredients for various cocktails. There are dozens of liqueurs and their discovery makes a fascinating journey of exploration. As well as the traditional ones, new liqueurs are constantly appearing.

Traditional liqueurs are made for serving on their own in small glasses before or after a meal and many have been incorporated into modern cocktails. ***Cointreau*** is orange-flavoured, as is ***Triple Sec*** which can be used as a substitute in a cocktail, achieving exactly the same effect, being to sweeten a cocktail. ***Parfait Amour***, a violet-coloured drop is equally as useful. ***Drambuie*** is Scotch whisky, aged with herbs. ***Tia Maria*** is a liqueur of coffee and Jamaican rum. ***Bailey's Irish Cream*** is a blend of cream, Irish whiskey and coffee. ***Malibu*** has coconut and rum.

Most liqueurs are a mixture of spirit such as white rum, vodka, gin or brandy and flavourings. Sometimes the flavouring is simply mixed with the spirit. With more prestigious liqueurs, the spirit is infused with the flavourings by aging the spirit with herbs and fruit extracts for longer periods. Many of the herbs used have a bitter character and therefore appeal more to mature tastes.

Bitter herbs such as gentian, cloves, coriander, ginger and juniper promote digestion and are popular before a meal because they make one hungry, or after a meal because they help dinner dissipate. Examples include ***Chartreuse, Underberg*** and ***Campari***. Try Campari mixed orange juice, soda and grapefruit juice. ***Angostura*** is another bitter liqueur used for mixing.

Fruit and vegetable infusions are known in Europe as Eau-de-Vie. ***Cassis*** is made of blackcurrants and is a well-known example. There are also spirits distilled directly from crushed fermented fruit. ***Calvados*** is brandy made from apples and other brandies are made from fruits such as pears and peaches.

The infused spirits have the greatest variety. ***Sambuca*** has aniseed flavouring and sweetness added to white spirit; ***Advocaat*** has egg yolk, brandy and vanilla; Kirsch has neutral spirit infused with cherries.

Several liqueurs have coconut essence – as mentioned, ***Malibu*** with rum, ***Kahlua*** with coffee as well.

There are thousands of cocktails that use various mixes of liqueurs. Some to tempt you are:

- the ***QF*** - Kahlua, Midori and Bailey's
- the ***B52*** - Bailey's, Kahlua and Cointreau
- the ***Slippery Nipple*** - Sambuca and Bailey's
- Drambuie with a shot of Johnnie Walker is a ***Rusty Nail***
- ***Sea Witch*** - 60 ml Strega, 30ml Blue Curacao, 90 ml sparkling wine. Serve very cold with a slice of lemon
- ***Margarita*** - 30 ml tequila, 15 ml lemon juice, 30 ml Triple Sec
- Frangelico Cafe - 2 parts Frangelico to 5 parts hot coffee; top with whipped cream and crushed hazelnuts
- alternatively, for an ***Angel's Kiss***, replace the coffee with steamed milk and top with cream and cinnamon
- ***Manhattan*** - 30 ml bianco Vermouth, 60 ml Scotch whisky, dash of bitters. Mix ingredients together in a glass of ice, pour into a chilled tumbler and garnish with orange peel
- ***Dry Martini*** - 15 ml dry Vermouth, 60 ml gin. Fill a large glass with ice cubes. Blend ingredients over ice and strain well into a chilled glass, add a couple of drops of bitters and garnish with an olive.

Over the Christmas holidays, explore and enjoy!

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other resources should be clearly stated. The contractor should be entitled to extend the time for performance of obligations where delay is caused by any factor beyond the contractor's control.

As the year 2000 approaches, demands for expert programmers will soar and so will salaries. Written employment contracts should be executed with all key personnel which incorporate incentives to remain in employment (eg. retrospective bonuses). In the absence of an appropriate contract, key employees may be lured to work elsewhere and as a result, the unadjustable deadline may not be met.

Organisations (including lawyers) should consider their exposure if key suppliers of goods or services have a major problem as a result of the Millennium Bug. The Year 2000 bug is only one of many date-related problems which can afflict software. For example, software must be able to cope with leap years. A computer failure on 31 December 1996 caused aluminium smelters in New Zealand and Tasmania (which used the same software) to suffer multi-million dollar losses. The failure occurred because the software was not designed to handle the 366th day which only occurs in a leap year.