Researchers aim to make debugging simpler

By Mike Crissey
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Computer bugs, or errors in software, can mess up just about anything. They've been blamed for missing homework, blackouts, prison breaks and even the loss of multimillion-dollar space probes.

They can be costly to the economy - almost $US50 billion ($A96 billion) a year, a 2002 federal study estimates.

But they're difficult pests to eliminate, because doing so requires programmers to perform "an elaborate detective investigation", said Brad Myers, a Carnegie Mellon University computer science professor.

"You are trying to make guesses about where the problem is and prove your hypothesis. A lot of time programmers guess wrong ... and add new bugs because they were trying to fix something that wasn't broken."

But help is on the way. Myers and a graduate student, Andrew Ko, have developed a debugging program that lets users ask questions about computer errors in plain English: "Why didn't a program behave as expected?"

Funded by $US1.2 million ($A1.72 million) from the National Science Foundation, Whyline - short for Workspace for Helping You - aims to simplify debugging and troubleshooting.

"This tool puts about 90 per cent of the questions people want to ask before them," Myers said.

Programming is a lot like translation. Writing code involves taking what you want to do and converting it into computer language; hunting down a bug requires the opposite, which sometimes isn't as easy.

Whyline aims to simplify debugging and troubleshooting.

While testing a program, if something appears to go awry, a user can hit the "Why" button, which stops the program.

Whyline then offers questions based on programmed events.

"For example, if a program contains rules about Pac-Man shrinking when he hits a ghost, Whyline will let the programmer ask "Why didn't Pac-Man resize?""

Lines of programming code related to the question are highlighted in a window. Another window shows what happened while the program was running, with a flow chart and timeline.

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In studies involving a handful of graduate students, from relative novices to experienced programmers, Ko and Myers found that Whyline could help users find bugs eight times faster and do 40 per cent more programming.

Another debugging tool includes AskIgor, a web-based program from Andreas Zeller, a professor at Saarland University in Saarbrucken, Germany.

Programmers tell AskIgor when a program works and when it fails, and AskIgor tries to determine differences that cause the bugs.

"When you compare debugging to walking through a dark house with a torch, AskIgor walks through the house and tells you what you can and cannot see," said Margaret Burnett, a computer science professor at Oregon State University and director of EUSES.

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