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Useful Books

- Programming in Ada 95**
 - by John Barnes (Addison Wesley)
- High Integrity Ada: The SPARK Approach**
 - by John Barnes (Addison Wesley)
- Object-Oriented Software Construction**
 - by Bertrand Meyer (Prentice Hall)
- Objects Unencapsulated: Java, Eiffel, and C++**
 - by Ian Joyner (Prentice Hall)
- C Traps and Pitfalls**
 - by Andrew Koenig (Addison Wesley)
- Effective C++**
 - by Scott Myers (Addison Wesley)

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Relevant Links

- <http://www.fsf.org>
 - The site of the GNU project and the Free Software Foundation
- <http://libre.act-europe.fr>
 - Interesting Free Software projects written in Ada 95
- <http://www.adahome.com/Tutorials/Lovelace/lovelace.htm>
 - Lovelace, on-line Ada 95 tutorial
- http://www.adaic.com/whyada/ada-vs-c/cada_art.html
 - Comparing Development Costs of C and Ada

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Software Dependability

Degree of confidence that can be justifiably placed on the system to operate as expected and not to fail in normal use

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```

=====
      STOP: 0x00000019 (0x00000000,0xC00E00FF,0xFFFFFD4,0xC0000000)
      BRD_POOL_HEADER
CPUID: GenuineIntel 5.2.c isql:1f SVSUER 0xF000565
=====
All Base DateStmp - Name Dll Base DateStmp - Name
0010000 3295374 - ntoskrnl.exe 8001000 31ee652 - hal.dll
0001000 31e4064 - atapi.sys 8006000 31ee674 - SCSIPORT.SVS
02c1000 31e4064 - atapi.sys 8007c00 31ee674 - Disk.sys
02d1000 31ee674 - CLASS2.SVS 8037c00 31ee6a7 - Ntfs.sys
0590000 31ee674 - Floppy.SVS f0c3800 31ee6e1 - Cdrom.SVS
c90a000 31ee6f7 - Fs_Rec.SVS f0c9c00 31ee699 - Null.SVS
c9c4000 31ee6f7 - KSecDD.SVS f0c3800 31ee6e1 - Romfs.SVS
c648000 31ee690 - i8042prt.sys f0c6c00 31ee697 - mouclass.sys
c974000 31ee694 - Abcdclass.sys f0c3800 31f9722 - VIDEOPORT.SVS
ef7a000 31ee6e2 - nra_all.sys f0b9000 31ee6e4 - vga.sys
c974000 31ee694 - Abcdclass.sys f0c3800 31ee6e1 - VIDEOPORT.SVS
efbc000 31ee6e2 - NDIS.SVS a000000 31f9547 - vga.sys
ef44000 31f91351 - nra.dll f0c3800 31ee6e1 - VIDEOPORT.SVS
efbc000 31ee6e2 - NDIS.SVS feaf000 31e40754 - nbf.sys
ef44000 31f91351 - nra.dll f0c3800 31ee6e1 - VIDEOPORT.SVS
efbc000 31ee6e2 - NDIS.SVS f0c3800 31f8865 - nbf.sys
ef44000 31f91351 - nra.dll f0c3800 31f8864 - af4.sys
c718000 31ee67a - netbios.sys f0c3800 31ee69b - Faxpppt.sys
c970000 31ee69b - Faxall1.SVS f0c3800 31ee69d - FaxUdm.SVS
c538000 31ee6b1 - Serial.SVS fe94000 31f886b - rde.sys
e43b000 31f7a1ba - nup.sys fe94000 32031abe - svw.sys

Address Dump Build [1301] - Name
01271c8 80144000 80144000 fdfdf00 c93000b 00000001 - ISecDD.SVS
014714c 80122000 80031000 f03ee00 e133c0d4 e133c0d4 - ntoskrnl.exe
0147304 803023f0 0000023c 00000034 00000000 00000000 - ntoskrnl.exe

Restart and set the recovery options in the system control panel
by the /CRASHDEBUG system start option.


```




Software Failures: Safety

- **1986: Therac 25 radiation machine kills patients**
 - Cause: poor testing of the software
- **June 4, 1996: maiden flight of Ariane 5 failed: rocket destroyed**
 - Cause: Code from Ariane 4 guidance system reused in Ariane 5 but not tested
- **2000: Deadly accident in French highway**
 - Cause: Software malfunction in car braking system. Car manufacturer acknowledges responsibility


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Software Failures: Security

- **November 2, 1988 Internet Worm**
 - A self-replicating program was released upon the Internet
 - This program (a worm) invaded VAX and Sun computers running versions of Berkeley UNIX, and used their resources to attack still more computers.
 - Within hours this program had spread across the U.S., infecting thousands of computers and making many of them unusable due to the burden of its activity.
 - Cause: undetected buffer overflow in C routine `gets()`
- **Many more interesting virus stories (especially on Windows ...)**

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1 in 3 Software Projects Doesn't Even Get There!

- **US Internal Revenue Service Modernization**
 - \$4 Billion, dropped in early 1997
- **FBI Fingerprint system**
 - \$500 million, dropped
- **Bell Atlantic 411**
 - November 1996, outage, backed out of upgrade

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