

## Errata<sup>□</sup>

### OPERATING SYSTEM CONCEPTS, TENTH EDITION (print edition) Silberschatz, Galvin, and Gagne

May 12, 2020

We list below errors, clarifications, and recent updates. NOTE: If you own an international edition note that these editions follow a different correction schedule, so your copy may still have errata that have been fixed in the US edition. Check your copy for the errata noted here, and ignore those that have been fixed in your copy.

#### Preface:

Page viii, second bullet: replace with → **E-text with print companion bundle.** For a nominal additional cost, the e-text also is available with an abridged print companion that includes the main chapters text, end-of-chapter “Practice Exercises”, and “Further Reading” sections.

Page xvii, line 2: **Rick** → **Rik**

#### Contents:

Page xxii: **Chapter A** → **Appendix A**

Page xxii: **Chapter B** → **Appendix B**

Page xxii: **Chapter C** → **Appendix C**

Page xxii: **Chapter D** → **Appendix D**

#### Chapter 1:

Page 8, line -6: **assicated** → **associated**

Page 13 line 19: **blu-ray** → **Blu-ray**

Page 25 line 17: **The instruction to switch to kernel mode is an example of a privileged instruction. Some other examples include** → **The instruction to switch to kernel mode is is handled specially (sometimes via a trap, sometimes as a unique instruction). Examples of privileged instructions include**

Page 30 line -16: **CD DVD** → **CD, DVD**

Page 31 figure 1.14 **SRAM** → **DRAM**

Page 35 line -14: **ESXand** → **ESX and**

#### Chapter 2:

Page 76 line -15: **most systems allow a program to dynamically link libraries as the program is loaded** → **most systems allow a program to dynamically link libraries as the program is loaded or even when it is executed**

Page 83 figure 2.13: **glibc standard c library** → **glibc standard C library**

Page 86 line -8: **We cover creating LKMs in Linux in several programming exercises at the end of this chapter** →

Page 94 line -16: **CPUand** → **CPU and**

Page 97 line 8: **In both this chapter and Chapter 3, we provide programming projects where you will create and access the /proc file system.** →

---

<sup>□</sup>Errors reported by: Peter Galvin, Greg Gagne, John Trono, Zdzislaw Ploski, Sinan Hanay

## Errata - page 2

### Chapter 3:

Page 108 example box line 10 `agrv` → `argv`  
Page 112 line 11: `CPU's core This` → `CPU's core. This`  
Page 112 line 12: `header contains pointers` → `header contains a pointer`  
Page 115 line 2: `of special instructions (such as a single instruction to load or store all registers). A typical speed is a several microseconds.` → `of special instructions (such as a single instruction to load or store all registers), and typical takes hundreds to thousands of nanoseconds.`  
Page 120 line 3: `VOID` → `void`  
Page 133 Figure 3.16: line 19: `oject` → `object`  
Page 134 Figure 3.17: line 15: `oject` → `object`  
Page 137 Figure 3.18: line -7: `MACH_RCV_MSG, // sending a message` → `MACH_RCV_MSG, // receiving a message`  
Page 143 Figure 3.23: line 5: `VOID` → `void`  
Page 144 Figure 3.24: line 10: `START_INFO` → `STARTUPINFO`  
Page 144 line -10: `pipe.` → `pipe`  
Page 145 Figure 3.25: line 3: `VOID` → `void`  
Page 145 Figure 3.25: line 6: `Readhandle` → `ReadHandle`

### Chapter 4:

Page 181 line 11: `problem)` → `problem))`  
Page 181 line 12: `problem)` → `problem))`  
Page 186 line 18: `block` → `block.`  
Page 187 line -13: `The second parameter is a C++ lambda` → `The third parameter is a C++ Lambda`  
Page 196 line 14: `parent process` → `parent task`  
Page 196 line -17: `Finally, the flexibility of the clone() system call can be extended to the concept of containers, a virtualization topic which was introduced in Chapter 1. Recall from that chapter that a container` → `Finally, the flexibility of the clone() system call can be extended to the concept of containers, a virtualization topic which is covered in chapter 18. A container`

### Chapter 5:

Page 242 line 6: `most optimal` → `optimal`  
Page 250 line -3: `real-time tasks,` → `real-time tasks.`  
Page 252 line -4: `listed below` → `listed above`

### Chapter 6:

Page 261 line 18: `variable kernel variable` → `kernel variable`  
Page 266 line -8: `Hardware Instructions` → `Further Hardware Instructions`  
Page 275 line 6: `If a semaphore value is negative, its magnitude` → `If a semaphore value is negative, its absolute value`  
Page 288 line -4: `Mckenney` → `McKenney`

### Chapter 7:

Page 290 line -15: `semaphore full` → `semaphore full;`  
Page 299 line 9: `thread-info` → `thread_info`  
Page 300 line -17: `POSIX specifies` → `POSIX SEM specifies`  
Page 303 line 13: `We provide several programming problems and projects at the end of this chapter that use Pthreadsmutex locks and condition variables, as well as POSIX semaphores.` →   
Page 312 line -13: `In Section 4.5.2` → `In Section 4.5.3`

## Errata - page 3

### Chapter 8:

Page 329 line -3: 25.0) → 25.0);  
Page 329 line -1: 50.0) → 50.0);  
Page 338 line -10: the possibility of deadlock → the possibility of a deadlock.  
Page 343 line -12: indicates deadlock. → indicates the possibility of a deadlock.

### Chapter 9:

Page 351 line 10: new Figure 9.1  
Page 356 line 10: the DLL in main memory → the DLL is in main memory  
Page 363 line -6: Pthreds → Pthreads  
Page 366 line -14: LRU entry replacement → TLB entry replacement  
Page 380 line -10: used to generate a linear address → used to generate the address  
Page 385 line 14: that contains the frame → that contains the frame number  
Page 385 line 21: if the frame for the page is in the TLB. If it is, the frame is obtained from the TLB. If the frame is not present in the TLB, it must be retrieved from the page table. → if the frame number for the page is in the TLB. If it is, the frame number is obtained from the TLB. If the frame number is not present in the TLB, it must be retrieved from the page table.  
Page 385 line -9: ARMv9 → ARMv8  
Page 387 line 8: PAE support for Windows systems.is → PAE support for Windows systems is  
Page 387 line 9: .aspx An overview → .aspx. An overview

### Chapter 10:

Page 399 line 20: these systems demand-page → these systems demand page  
Page 399 line 22: data can be demand-paged → data can be demand paged  
Page 435 Figure 10.28 title: why frames used → why pages used

### Chapter 11:

Page 456 line 20: between the cache host DRAM → between the cache and host DRAM  
Page 465 line 7: DIRECT → `DIRECT`  
Page 485 line 3: hard drives and nonvolatile → hard drives and other nonvolatile

### Chapter 12:

Page 495 figure 12.4 title: Mac OS X → macOS  
Page 497 line 17: handing → handling  
Page 498 line 19: Windows10 → Windows 10  
Page 506 line 6: issues a blocking system → issues a blocking (synchronous) system  
Page 506 line 9: run queue → ready queue  
Page 506 line 10: run queue → ready queue  
Page 507 line -3: readv → readv()  
Page 510 line -1: physical memory → main memory  
Page 512 line -13: monitor mode → kernel mode  
Page 514 line -6: CPUsand → CPUs and  
Page 517 line 6: and that table entry tells → and that table entry (in a nutshell) tells  
Page 518 line 14: run queue → ready queue

### Chapter 13:

Page 532 line 3: create, write, read → create, open, write, read

## Errata - page 4

Page 533 line 18: **create()** and **delete()** are system calls that work with closed → **create()** is a system call that **creates files** and **delete()** is a system call that works with closed  
Page 538 line 15: **ASCII characters** → **text**  
Page 544 line -13: **version number** → **version number of the file**  
Page 544 line -12: **directory name** → **path name**  
Page 554 line 13: **on Windows 7 NTFS file system**. In this example, user “guest” is specifically denied access to **the file ListPanel.java** → **on Windows 10**.

### Chapter 14:

Page 579 line 16: **which is the location** → **whose position counted from the beginning of the bitmap is the location**  
Page 581 line -14: **do not allow overwrite** → **do not allow immediate overwrite**  
Page 595 line 7: [http://src.opensolaris.org/source/xref/onnv/onnv-gate/usr/src/uts/common/fs/zfs/space\\_map.c](http://src.opensolaris.org/source/xref/onnv/onnv-gate/usr/src/uts/common/fs/zfs/space_map.c)  
→ <http://open-zfs.org/wiki/Documentation>  
Page 595 line 8: <http://www.opensolaris.org/os/community/ZFS/docs> → <https://github.com/openzfs/>  
Page 595 line 10: **Ext3** → **Ext4**

### Chapter 16:

Page 624 Figure 16.1: **logic bugs** → **logic bombs**  
Page 628 Figure 16.2: **return 0 ; }** → **return 0 ;**  
Page 638 line -24: **sender can encode** → **sender can encrypt**  
Page 638 line -23: **can decode** → **can decrypt**  
Page 641 line 7: **.edu /hellman** → **.edu/helman**  
Page 641 line 8: **must a key** → **must a public key**  
Page 645 Figure 16.9: **should have vertical lines connecting message m to encryption algorithm E, etc**  
Page 649 line -17: **four-character** → **four-decimal**  
Page 649 line -14: **four-character** → **four-decimal**  
Page 665 line -17: **security-center/research** → **security-center/research**. See also <https://www.us-cert.gov>.

### Chapter 17:

Page 685 line 12: **processes). When** → **processes), when**  
Page 685 line 3: **FreeBSD made DAC** → **FreeBSD made MAC**  
Page 685 line 6: **security features of MAC** → **security features of macOS**  
Page 689 line 14: **fork system call** → **fork() system call**

### Chapter 18:

Page 721 line -10: **the operating system** → **the guest operating system**  
Page 724 line -2: **discernable** → **discernible**  
Page 727 Figure 18.9: **free BSD** → **FreeBSD**

### Chapter 19:

Page 742 line -15: **data-network layer** → **data-link layer**  
Page 744 Figure 19.7: **presentation layer** → **presentation layer header**  
Page 744 Figure 19.7: **application layer** → **application layer header**  
Page 747 Figure 19.10: **inital** → **initial**  
Page 749 Figure 19.11: **inital** → **initial**  
Page 770 line 3: **K. Shvachko** → **S. Shvachko**  
Page 770 line -19: <http://standards.ieee.org/about/get/802/802.11.html> → [https://standards.ieee.org/standard/802\\_11-2016.html](https://standards.ieee.org/standard/802_11-2016.html)  
Page 771 line 9: **K. Shvachko** → **S. Shvachko**  
Page 771 line -6: **Approacm** → **Approach**

## Errata - page 5

### Chapter 20:

Page 791 line -26: **process runs for** → **thread runs for**  
Page 791 line -26: **process runs for** → **thread runs for**  
Page 791 line -25: **process runs for** → **thread runs for**  
Page 791 line -12: **switch costs are maximized** → **switching costs are optimized**  
Page 813 line -16: **memory-mapped memory** → **memory-mapped file**

### Chapter 21:

Page 834 line 4: **Figure Figure** → **Figure**  
Page 845 line 19: **compute the exact number** → **compute the number**  
Page 850 line -14: **HarddiskVolumeN** → **HarddiskVolume2**  
Page 861 line -15: **WINXXIII** → **Win32**  
Page 865 Figure 21.6: **VM manager** → **MM manager**  
Page 871 line 10: **UWPModern/Metro** → **UWP Modern/Metro**  
Page 872 line -5: **storage manager** → **compression store manager**  
Page 881 line -6: **Uniform Naming Convention** → **Universal Naming Convention**  
Page 887 line 14: **CreateProcess** → **CreateProcess()**  
Page 892 line 18: **ChangeWindowMessageFilterEx** → **ChangeWindowMessageFilterEx()**  
Page 893 Figure 21.12: **8MB** → **8 MB**  
Page 895 Figure 21.13: **T1s** → **Tls** (4 times)  
Page 895 line -13: Move the following fragment to the end of section 21.7.5.4:  
    To use a thread-local static variable, the application declares the variable as follows to ensure that every thread has its own private copy:  
        \_declspec(thread) DWORD cur pos = 0;

### Credits:

Page 963: line 4: **Sebree** → **Sebre**

### Appendix A:

Page A.12: **Mac OS** → **MacOS**  
Page A.18: **MacOSand** → **MacOS and**  
Page A.18: **IOSvariants** → **IOS variants**  
Page A.21: **[Frah (2001)]** → **[IFrah (2001)]**  
Page A.22: **Frah** → **IFrah**

### Appendix B:

Page B.6: **SNM** → **SNMP**  
Page B.43: **Uniform Naming Convention** → **Universal Naming Convention**  
Page B.54: **T1s** → **tls**

### Appendix C:

Page C.1: line 6, **UnixBSD** → **FreeBSD**  
All pages: **<X.Y> BSD** → **<X.Y>BSD**  
Page C.3: line -4, **see Chapter 11** → **See Chapter 14**  
Page C.4: line -10, **and is replacing** → **and replaced**  
Page C.13: line -9, **bs character** → **fs character**  
Page C.16: line xxx, **% %** → **%**  
Page C.18: line -9, **is rapidly becoming** → **rapidly became**  
Page C.31: line 16, **synchronized** → **consistent**

## Errata - page 6

Page C.36: line 17, **system phase** → **system mode**

### Appendix D:

Page D.5: **include a copy of the message** → **include a pointer to a copy of the message**

Page D.18: **multicomputers** → **multiple computers**

Page D.22: **multicomputers** → **multiprocessor computers**