Appendix A: How to use the Solaris Machines

Solaris

- Operating system from the UNIX family.
  Like the Linux system, which you can get for free.
  A non-commercial license of Solaris is also more or less free.
- I.e. multi-tasking, multi-user, good networking capabilities.
  UNIX had all this long before PC operating systems and is more mature. It was mainly used by programmers, but now there are user-friendly interfaces as other OS have. It relies more on standards than PC operating systems.
- Developed by SUN Microsystems (`http://www.sun.com`).
  The company who also invented Java.
- Runs on SPARC processors and on Intel processors.
- Uses X11 (+Motif) for graphical input/output.

Overview

1. Graphical Interface: CDE
2. UNIX Commands
3. Working with Floppy Disks

Common Desktop Environment

- After you have entered user name & password, the graphical user interface “Common Desktop Environment” is started.
- This is a standard managed by “The Open Group”.
  You can have the same user interface on machines from IBM, HP, Compaq Alpha systems, etc.
  `http://www.opengroup.org/regproducts/xd.htm`
- Selections are done by clicking with the left mouse button.
- The active window is marked with a red frame. All keyboard input goes into this window.
  Move the mouse cursor in a window to make it active. You may have to click into the window (see style manager).

Front Panel (1)

- At the bottom of the screen is a central control bar, called the front panel.
- If you click with the left mouse button on the "books with question mark" symbol, you start a help viewer.
  The help viewer gives a good first introduction to the CDE.
- If you click on the word "EXIT" the logout dialog box appears. (You can choose "OK" or "Cancel").
- The CDE offers four different screens ("workspaces").
  You can switch between them by clicking on "One" etc.
  You can rename the workspaces by clicking again in the currently selected workspace on the front panel.

Front Panel (2)

- Text editor: click on the "paper with pencil" symbol.
- File manager: click on the left "file cabinet" symbol.
  To open a folder or a file or to start a program, you must double-click it with the left mouse button.
- Application Manager: right "file cabinet" symbol.
  This is simply a file manager for programs.
- Style manager: click on "palette/mouse/TTT" symbol.
  This allows to customize the user environment. E.g., you can choose whether a window gets the keyboard focus whenever the mouse cursor is inside ("Point in Window to make active") or whether you need to click into it.

Windows Controls (1)

- The button in the upper right corner ("maximize") enlarges the window to fill the entire screen.
  If you click again on it, the window gets its original size.
- The other button on the right side of the upper bar ("minimize") turns the window into an icon.
  If you click on the icon, the original window is restored.
- The button on the upper left corner opens the window menu (of the workspace manager).
  E.g. "Occupy Workspace" moves the window to another screen (workspace), "Lower" puts this window behind other windows in the same part of the screen.

Windows Controls (2)

- Move a Window:
  Press the left mouse button when the mouse pointer is over the title bar of the window. Move it to the new place while the mouse button is still pressed.
- Resize a window:
  Press the left mouse button while the pointer is over the outer frame of the window. Keep it pressed while you extend/shrink it to the new size.
- You delete a window either by pressing "⟨Alt⟩+⟨F4⟩" or by chosing "Close" from the window menu.
  This terminates the program running in the window.

Scrollbars

- A scrollbar (on the right side of a window) is used when the window is smaller than the contents it has to display.
- The scrollbar has two arrows at the top and bottom. Clicking on them moves the window one line up/down.
- The size of the slider in the center of the scrollbar shows which proportion of the data you can see in the window.
- You can drag the slider up and down to move the window.

  Or click with the middle mouse button at the position.
- If you click with the left mouse button above/below the slider in the scrollbar, it moves up/down one page.

  Or use the “Page Up” / “Page Down” keys.

Copy and Paste

- You can copy and paste text between windows.
- Select the text.

  Go to the start of the text, press the left mouse button and keep it pressed while you move to the end of the text. It is shown highlighted. If you double click on a word, this is selected. Triple clicking selects the entire row.
- Then you go to the window where you want to insert the text and press the middle mouse button.
- Alternatively, you can use the “Copy” and “Paste” keys.
- Or you “drag” the selected item to the window where you want it.

Starting Programs (1)

- If you press the right mouse button outside a window, you get the workspace menu.

  You can either keep the mouse button pressed, move it to your selection, and release it. Or you do only a click with the right mouse button, so that the menu pops up. Then you can move to your selection and click again.

  If you click with the right mouse button inside a window, you will usually get the pop-up menu of that application.
- Check the “Programs” and “Local Programs” submenus.

  While the mouse button is pressed, move over the submenu entry in the main menu and then leave it to the right, so that the submenu appears.

Starting Programs (2)

- You can also use the application manager (see above).
- Programs with text-based interfaces (e.g. SQL*Plus) must be started within a “Terminal” window.

  Select “Programs”/“Terminal” from the workspace menu. Inside this window, a UNIX command line interpreter (shell) runs, in our case the “bash”. Here you can enter the command you want to execute, e.g. `sqlplus`.
- Also programs which open their own window (e.g. Netscape) can be started in this way.

  If you want that the shell accepts further commands after starting the program, enter a `&` at the end of the command line, e.g. “`netscape &`”.

Overview

1. Graphical Interface: CDE
2. UNIX Commands
3. Working with Floppy Disks

UNIX (1)

- UNIX has a hierarchical file system.

  I.e. there can be folders (directories) inside folders.
- The root of this tree of folders/directories is denoted “/”.
- The slash / is also used to separate folder names in a path, e.g. `/home/sbrass/public_html`

  MS-DOS uses a backslash \. UNIX has also no “`C:`” etc. File names can be long, and can contain multiple “.”. A single “.” is used to denote the current directory.
- You can specify files relative to the current directory.

  E.g. `x.sql` means the file `x.sql` in the current directory, and `../sql/x.sql` means go up one folder, then down into the folder `sql`, and take the file `x.sql` there.

UNIX (2)

- UNIX is a multi-user system.

  The command “`who`” shows you who is currently logged in.
- You have a home directory (e.g. “`/home/sbrass`”), which is the current directory after you logged in.

  It and all subdirectories belong to you. The system stores for every file and directory the owner and the group, as well as rights for owner, group, and all others (see below). You can use “`~`” to denote your home directory and “`~user`” for someone else’s home directory (in csh/bash).
- There are limits for the disk space you can use.

  Use the command “`quota -v`” to see the limits.
- You can change your password with “`nispasswd`”.

UNIX (3)

- `ls`: List contents of current directory.
- `ls -l`: List current directory (long form, more info).

  Directories are marked with a “d” in the first column. Then follow the read/write/execute rights (rwx) for the owner, the group, and all others. E.g. `-rw-r--r--` is a file which all can read, and only the owner can write. Execute rights for directories mean that the user is allowed to pass through the directory. After the rights follow name of owner and group, then the file size in bytes, then date and time of last change, and finally the file name.
- `ls -al`: List also hidden files (all files, long form).
- `ls` ⟨Dir⟩: List other directory.

UNIX (4)

- `cd` ⟨`Dir`⟩: Change to directory ⟨`Dir`⟩.
- `cd`: Change to home directory.
  You are in this directory after you logged in.
  It and all subdirectories belong exclusively to you.
- `mkdir` ⟨`Dir`⟩: Create a new folder/directory.
- `rmdir` ⟨`Dir`⟩: Delete folder/directory (must be empty).
- `rm` ⟨`File`⟩: Delete file.
- `rm -r` ⟨`Dir`⟩: Remove folder with all its contents.
- `mv` ⟨`From`⟩ ⟨`To`⟩: Rename a file.
- `mv` ⟨`From`⟩ ⟨`Dir`⟩: Move file into other directory.

UNIX (5)

- `cp` ⟨`From`⟩ ⟨`To`⟩: Copy file.
  ⟨`To`⟩ can be file name or directory.
- `cp -r` ⟨`From`⟩ ⟨`To`⟩: Copy directory recursively.
- `chmod a+r` ⟨`File`⟩: Give all users the read permission.
- `chmod go-rwx` ⟨`File`⟩: Remove all rights from other users.
- `lpr -Plw8c` ⟨`File`⟩: Print file.
  The file can be an ASCII text file or a Postscript file.
  The printers in room 819 are “`lw8b`” and “`lw8c`”.
- `lpq -Plw8c`: Show the print queue for “`lw8c`”.
- `lprm -Plw8c` ⟨`ID`⟩: Cancel a print job.

UNIX (6)

- `less` ⟨`File`⟩: View contents of a file.
  Press ⟨Space⟩ to see the next page, ⟨Return⟩ to move line by line, “`q`” to quit, and “`h`” for a command list. “`less`” is an extended version of the standard UNIX program “`more`”.
- `dtpad` ⟨`File`⟩ `&`: Start simple text editor with GUI.
  This is the same editor as you get via the front panel.
  The more advanced editors `vi` and `emacs` are also available.
- `man` ⟨`Command`⟩: View information about a command.
  This uses “`less`” as a pager. You can also get a “man page viewer” via the applications manager (in the folder “`Desktop_Apps`”) or with `dthelpview -man`.
- `grep` ⟨`Pattern`⟩ ⟨`Files`⟩: Search string or pattern in files.

UNIX (7)

- ⟨`Control`⟩+`C`: Interrupt current program.
  This may terminate the program, but some ignore it.
- ⟨`Control`⟩+`Z`: Suspend the current program.
  “`bg`”: continue execution in background, “`fg`”: foreground.
- ⟨`Control`⟩+`D`: Signal “end of file”.
- ⟨`Control`⟩+`S`: Stop terminal output.
  You continue it with ⟨`Control`⟩+`Q`.
- `ps`: List all processes controlled from this terminal.
  `ps -ef` lists all processes with full information.
- `kill -9` ⟨`Process Number`⟩: Terminate process.
  The process doesn't get a chance to save data in this way.

Shells

- On UNIX, a command line interpreter is a normal program and not part of the operating system.

  There are several such “shells”. We use the “bash”.
- The task of a shell is to read the name of a program you want to start (plus possible arguments) and to tell the operating system to execute your program.
- Please note the difference between a UNIX shell and SQL*Plus. A UNIX shell will not understand SQL queries.

  You start the program “sqlplus” using a UNIX shell. When you see the prompt “SQL>”, you can enter SQL queries, which will be processed by SQL*Plus. When you leave SQL*Plus with “quit”, you return to the UNIX shell.

The “Bourne Again Shell” bash (1)

- The bash uses GNU readline as command line editor.

  You can use, e.g., the cursor left and right keys,
  ⟨Del⟩ and ⟨Backspace⟩ for deleting the character to the left,
  ⟨Control⟩+D for deleting the character under the cursor,
  ⟨Control⟩+W to delete the last word,
  ⟨Control⟩+U for deleting everything to the left,
  ⟨Control⟩+A to get to the beginning of the line,
  ⟨Control⟩+E to get to the end of the line,
  ⟨Control⟩+V to enter the next character verbatim.
  The ⟨Tab⟩ key tries to complete command and file names.
- The cursor up and down keys let you navigate in the command history.

The “Bourne Again Shell” bash (2)

- `history`: View list of last commands.
- `!!`: Repeat the last command.
- `!25`: Repeat command number 25.
- `!sq`: Repeat the last command starting with “sq”.
- `^ab^cd`: Replace “ab” by “cd” in last command.
- `ls >out`: Write output of `ls` into file “out”.

  Only normal output is redirected this way. To redirect standard error output also, use the syntax “`>out 2>&1`”.
- `cat <in`: Input redirection.
- `ps | grep sql`: “Pipe” output of “`ps`” into “`grep sql`”.

The “Bourne Again Shell” bash (3)

- You can use wildcards for specifying files:
  - `*`: All files in the currect directory.

    The `*` also matches the “`.`” in file names.
  - `a*.sql`: All files starting with “a” and ending in “`.sql`”.
  - `???`: All file names of exactly three characters.
  - `[ab]*`: All file names starting with either “a” or “b”.
- If you want to use these special characters (or a space) in arguments, include it in single quotes.
- When the bash is started, it executes the commands in `.bashrc` (on the SIS systems please use `.bash_personal`).

Environment Variables

- UNIX programs not only process their command line arguments and get input from the user or a file, but it also can access environment variables.
- The environment variable `PATH` lists all directories in which the shell looks for executable programs.
- Oracle requires that `ORACLE_HOME` etc. are defined.
- "`env`" lists all currently defined environment variables.
- You define one in the form "`Var=Value`", "`export Var`".
- The shell substitutes "`$Var`" by the value of "`Var`".
  E.g. you can write "`cd $ORACLE_HOME/doc`".
  "`echo $Var`" prints the value of "`Var`".

Overview

Working with Floppy Disks (1)

- Put the MS-DOS formatted disk into the floppy disk drive.
  - Then enter the command `volcheck`.
    The floppy disk is then mapped into the UNIX file system under `/floopy/floppy0`. If it has a label, it is also available under `/floppy/`⟨`Label`⟩.
  - Or choose "`File/Open Floppy`" in the file manager.
- `unix2dos` ⟨From⟩ ⟨To⟩: Copy file, map ⟨LF⟩ into ⟨CR⟩⟨LF⟩.
  E.g. `unix2dos my.sql /floopy/floppy0/my.sql`.
  In contrast to `cp`, it does not suffice to specify the goal directory. Note that binary files must be copied with `cp`!
- `dos2unix` ⟨From⟩ ⟨To⟩: Copy file, map ⟨CR⟩⟨LF⟩ into ⟨LF⟩.

Working with Floppy Disks (2)

- You should use the command `eject` before taking your disk.
  On some systems, the floppy disk will be automatically ejected. On other systems, the disk is unmounted (i.e. removed from the UNIX file system) and you have to manually eject it afterwards. The command "`eject -p`" does not use a popup for the "eject manually" message.
- You can also use "`File/Eject`" in the file manager window for a floppy disk.
- `fdformat -dHv`: Format a 1.44 MB disk (MS-DOS format).
  If the disk is already mounted by a previous `volcheck`, use "`fdformat -dHvU`".

Working with Floppy Disks (3)

- There are programs to simulate some MS-DOS commands mattrib, mbadblocks, mcd, mcopy, mdel, mdeltree, mdir, mformat, mkmanifest, minfo, mlabel, mmd, mmove, mrd, mren, mtype, xcopy, see “`man mtools`”.
  - `mdir`: List the contents of the disk.

    Use `volcheck` first. “`mdir ⟨Dir⟩`” lists directory.
  - “`mcopy -t ⟨Unix File⟩ a:`”: copy file onto disk.

    For binary files, don’t use “`-t`”. The second argument can also be a file (e.g. “`a:my.sql`”) or a folder.
  - `mcopy -t a:⟨MS-DOS File⟩ ⟨Unix File or Folder⟩`

    This copies a file from the disk. You can use wildcards like “`*`”, but only with quotes, e.g. “`mcopy 'a:*' .`”.