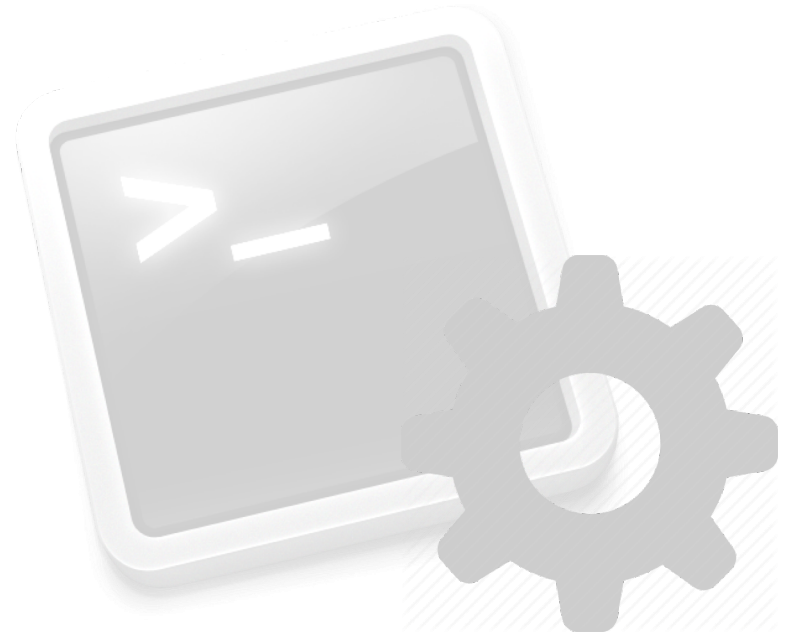
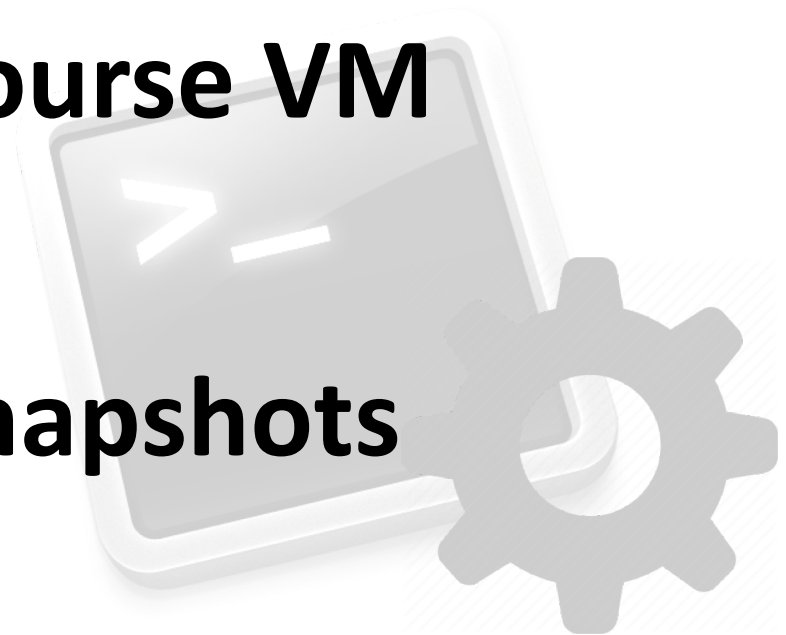


Lab 0 – Getting Started

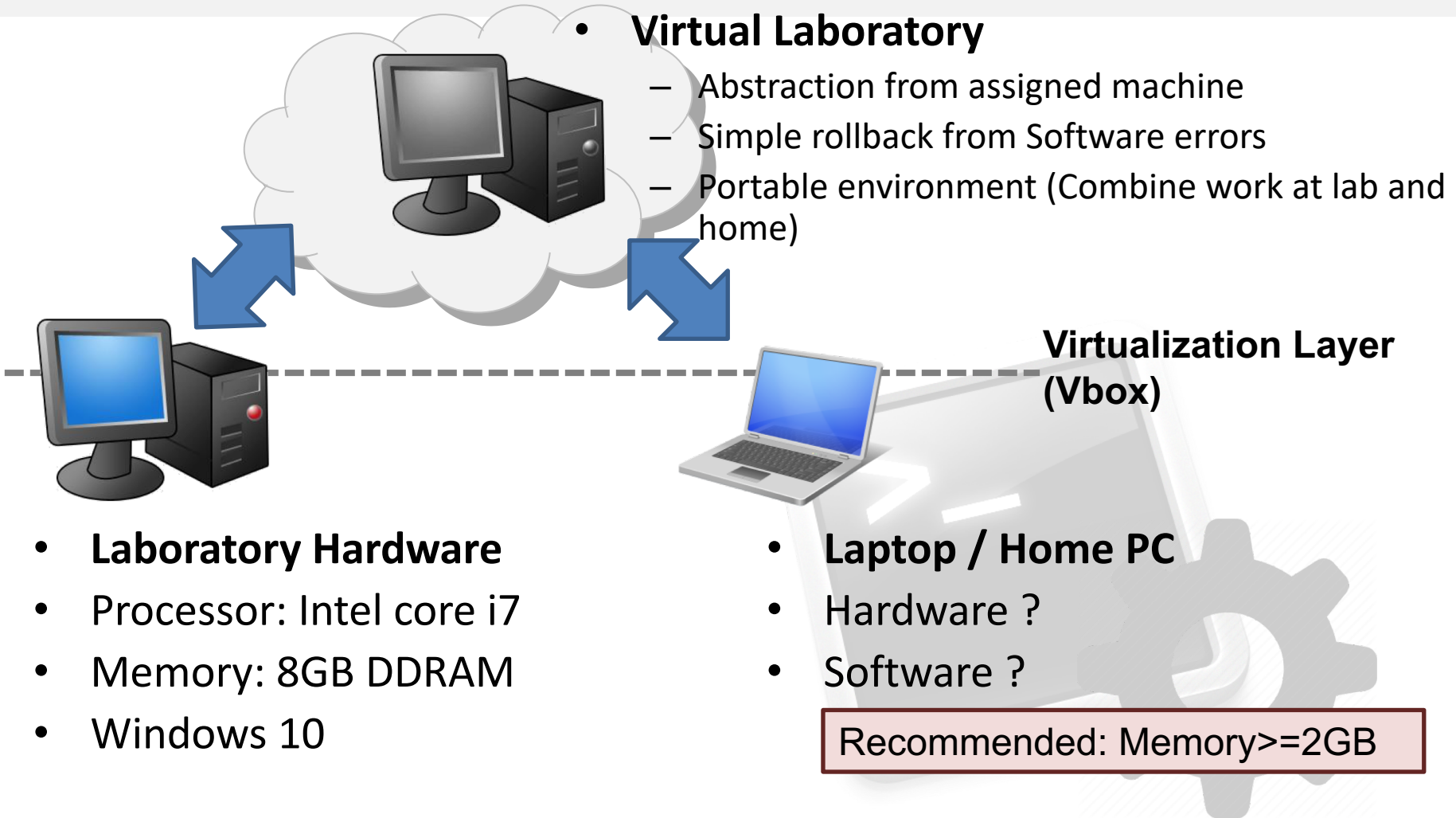


Session Index

- **Preparation: Lab & Virtualization**
- **Assignment 1: Course VM**
- **Assignment 2: Snapshots**



Preparation: Lab & Virtualization

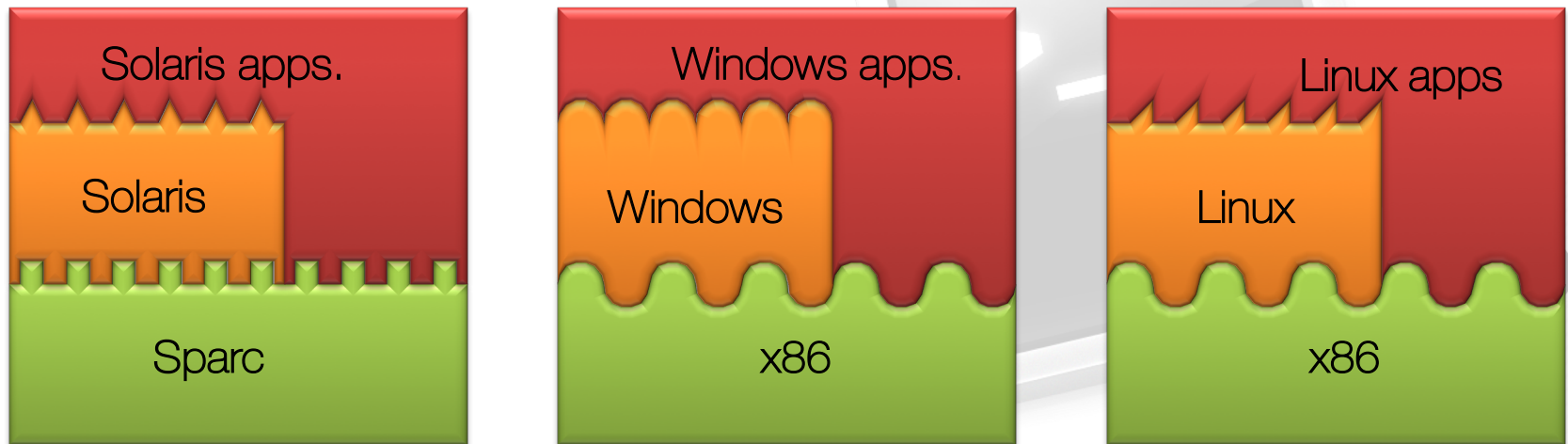


Preparation: Virtualization

- **Interfaces:**

- Key aspect to deal with the complexity of a modern computer
- Interface hides implementation details (mult instruction provided by ISA, no need to know how multiplication is implemented in HW): Employed both in HW and SW

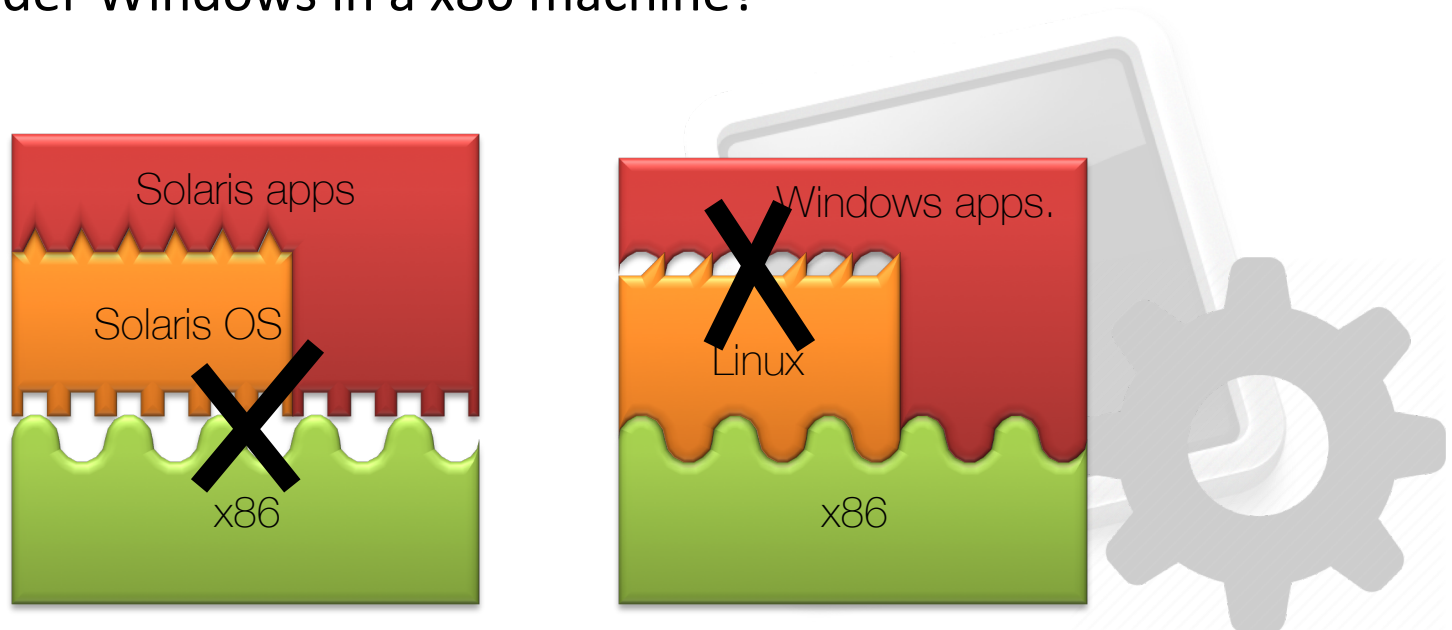
- **Examples:**



preparation: Virtualization

- **Disadvantages of Interfaces:**

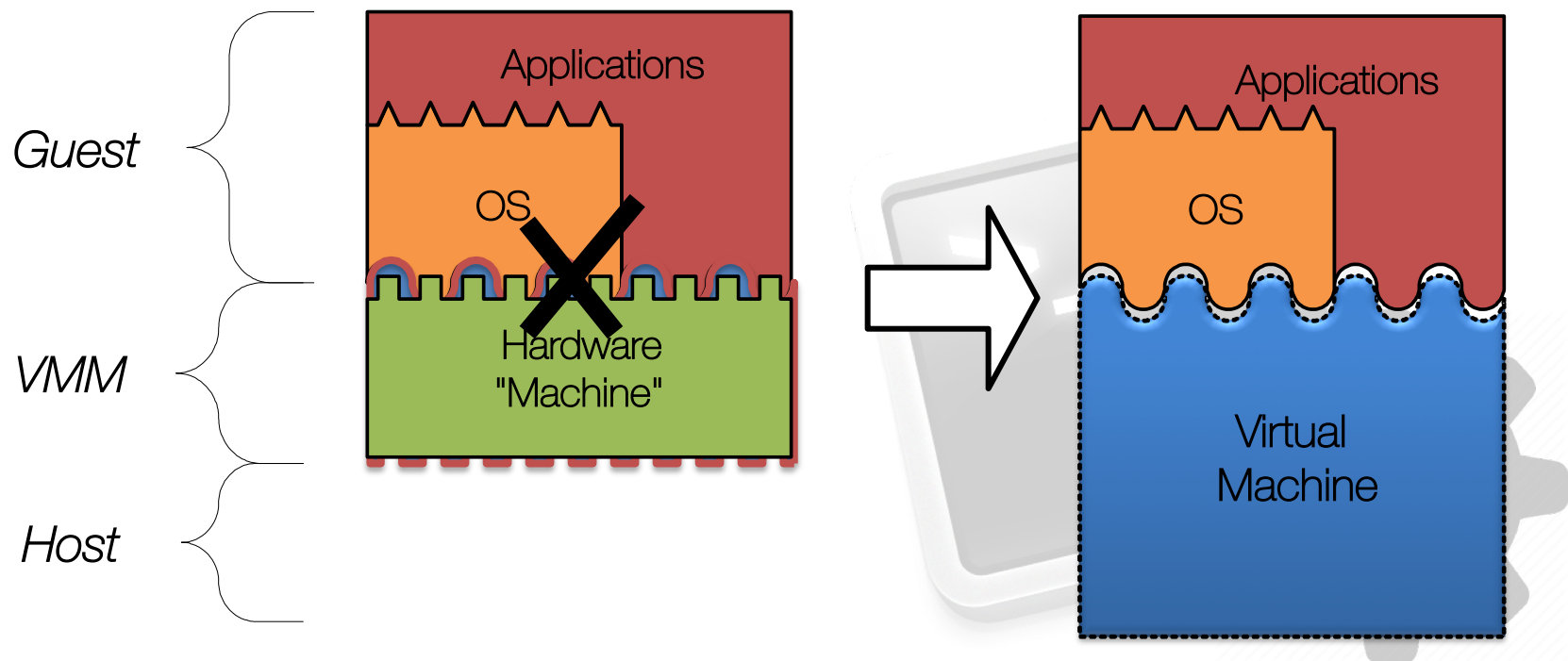
- Software compiled for a specific ISA cannot be executed in a HW with different ISA. How can a Solaris (Sparc) binary run in a x86?
- Even with the same ISA, OS can differ. Can linux applications run under Windows in a x86 machine?



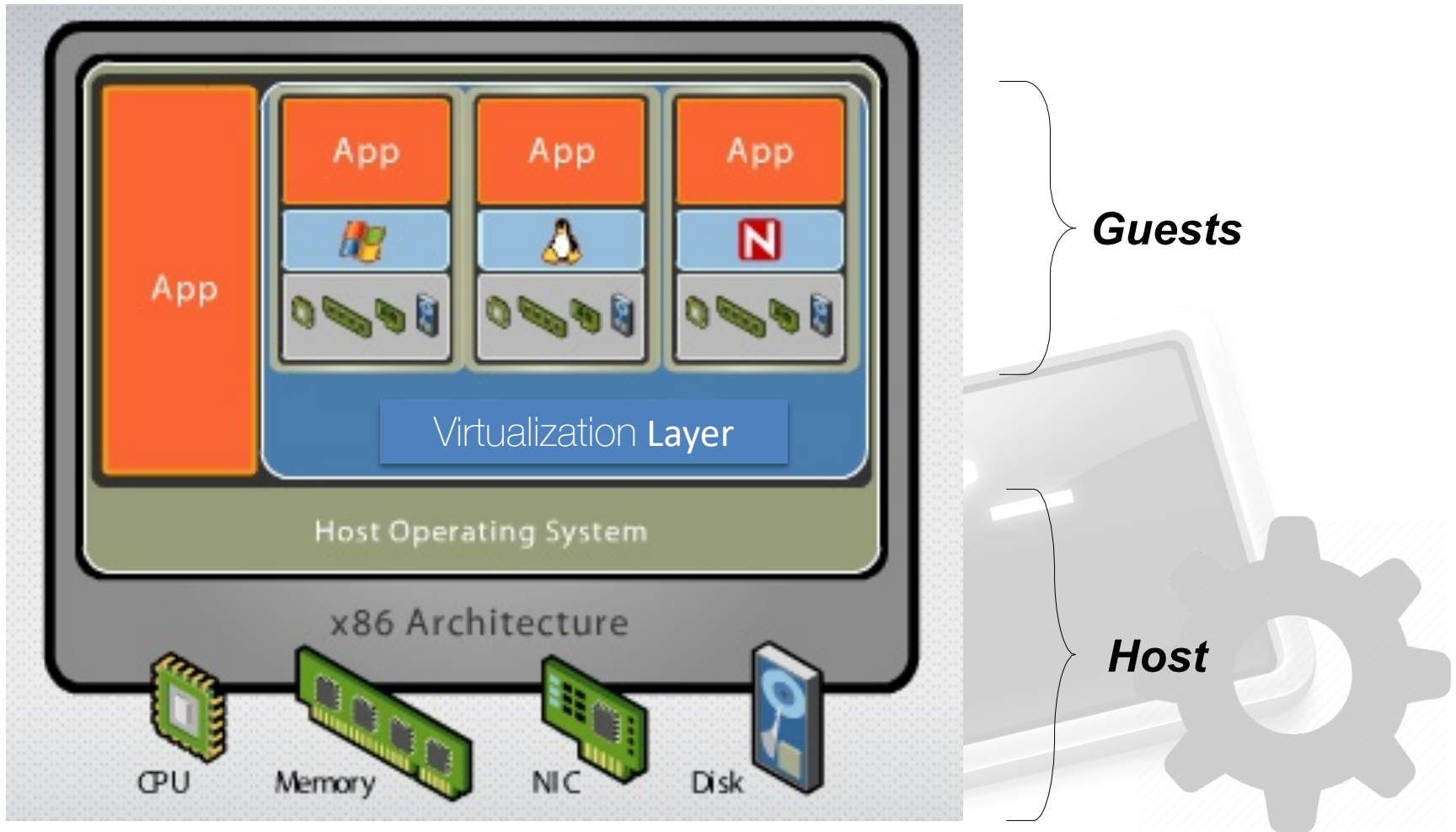
preparation: Virtualization

- **Solution: Virtualization**

- Add a Software layer which allows to overcome the limitations of Interfaces.



preparation: Virtualization



preparation: Virtualization



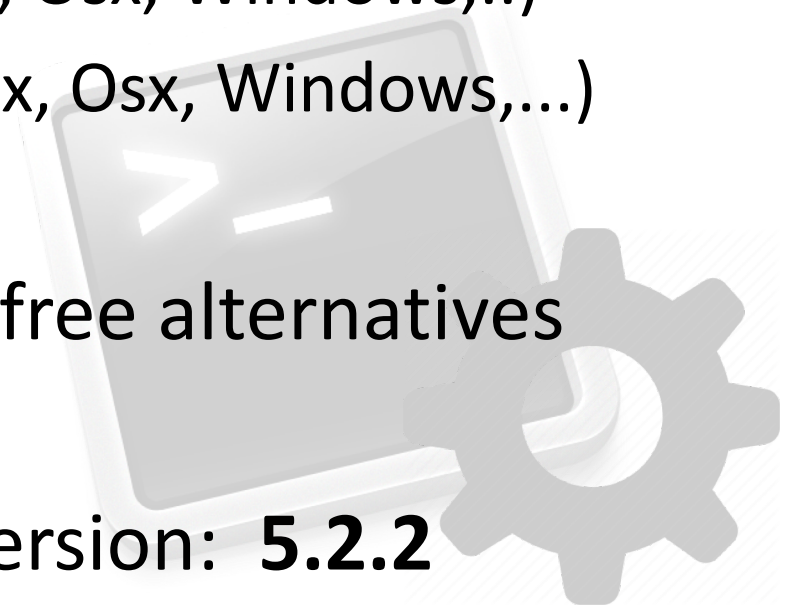
- **VirtualBox**

- Initially developed by Sun, currently supported by Oracle, under **GPL** license.
- Multiplatform Host (Linux, OSX, Windows,...)
- Multiplatform Guest (Linux, OSX, Windows,...)

- More flexible than other free alternatives

- VMware Player

- Always employ the last version: **5.2.2**



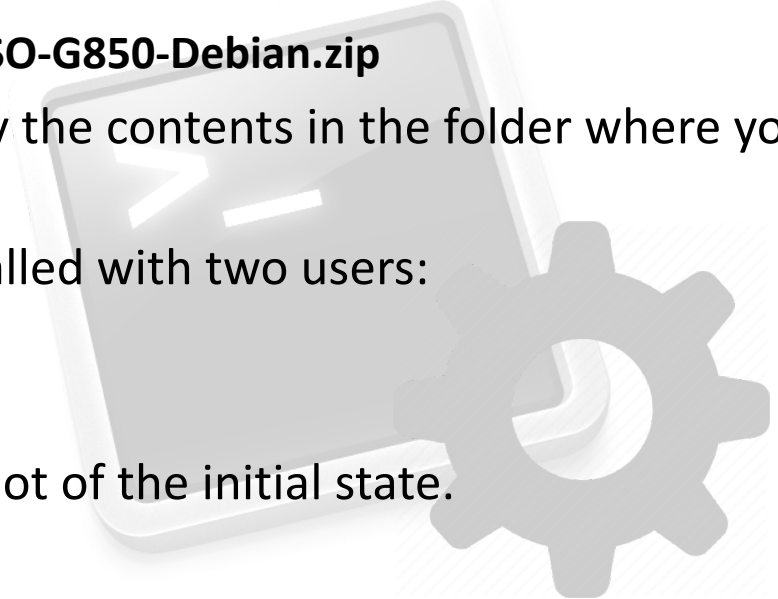
Session Index

- preparation: Lab & Virtualization
- **Assignment 1: Course VM**
- Assignment 2: Snapshots



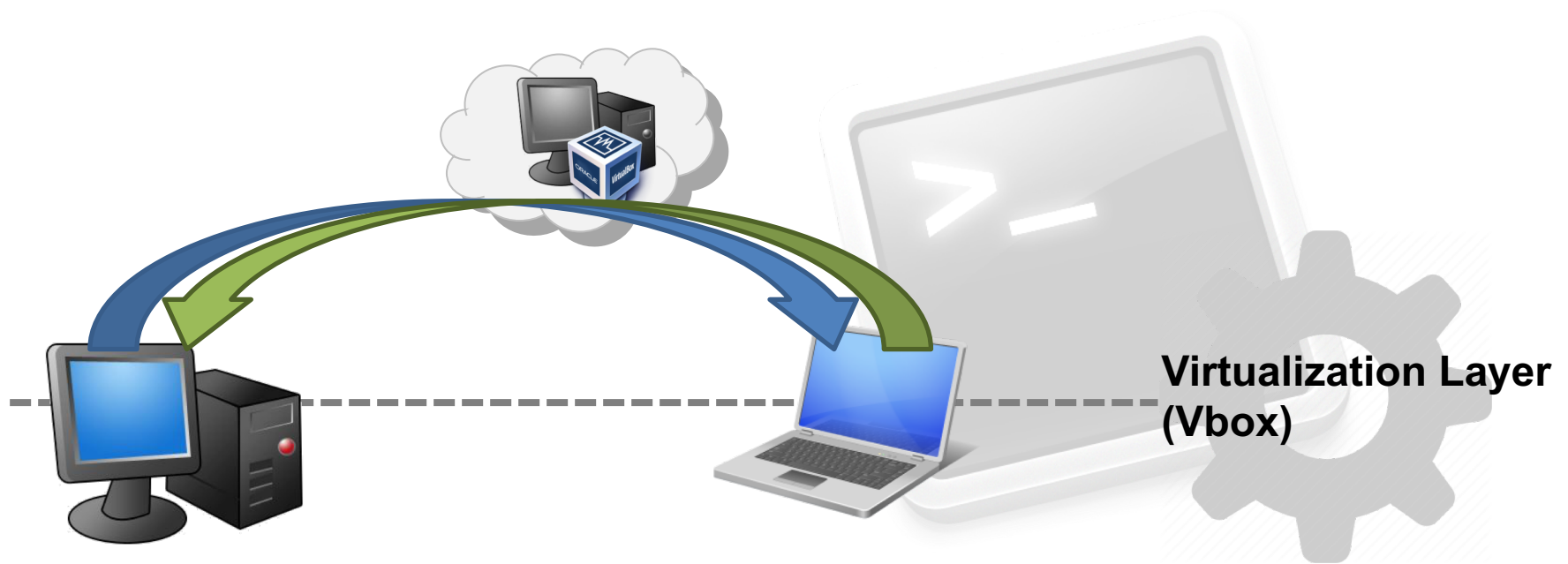
Assignment 1: Course VM

- We will make use of a VM specially created and optimized for this course
 - Common starting point for everybody.
 - Includes part of the tools employed in lab.
 - Optimized to work with VirtualBox.
 - The lab can be done in any Linux environment anyway.
- The link below contains a zip file with the Machine for this course.
<http://personales.unican.es/prietop/SO-G850-Debian.zip>
- Download and uncompress the file. Copy the contents in the folder where you want to work.
- The Virtual Machine has a Debian 9 installed with two users:
 - User: root // password: root
 - User: alumno // password: alumno
- Add the VM to Vbox and create a snapshot of the initial state.
 - (more on that later)



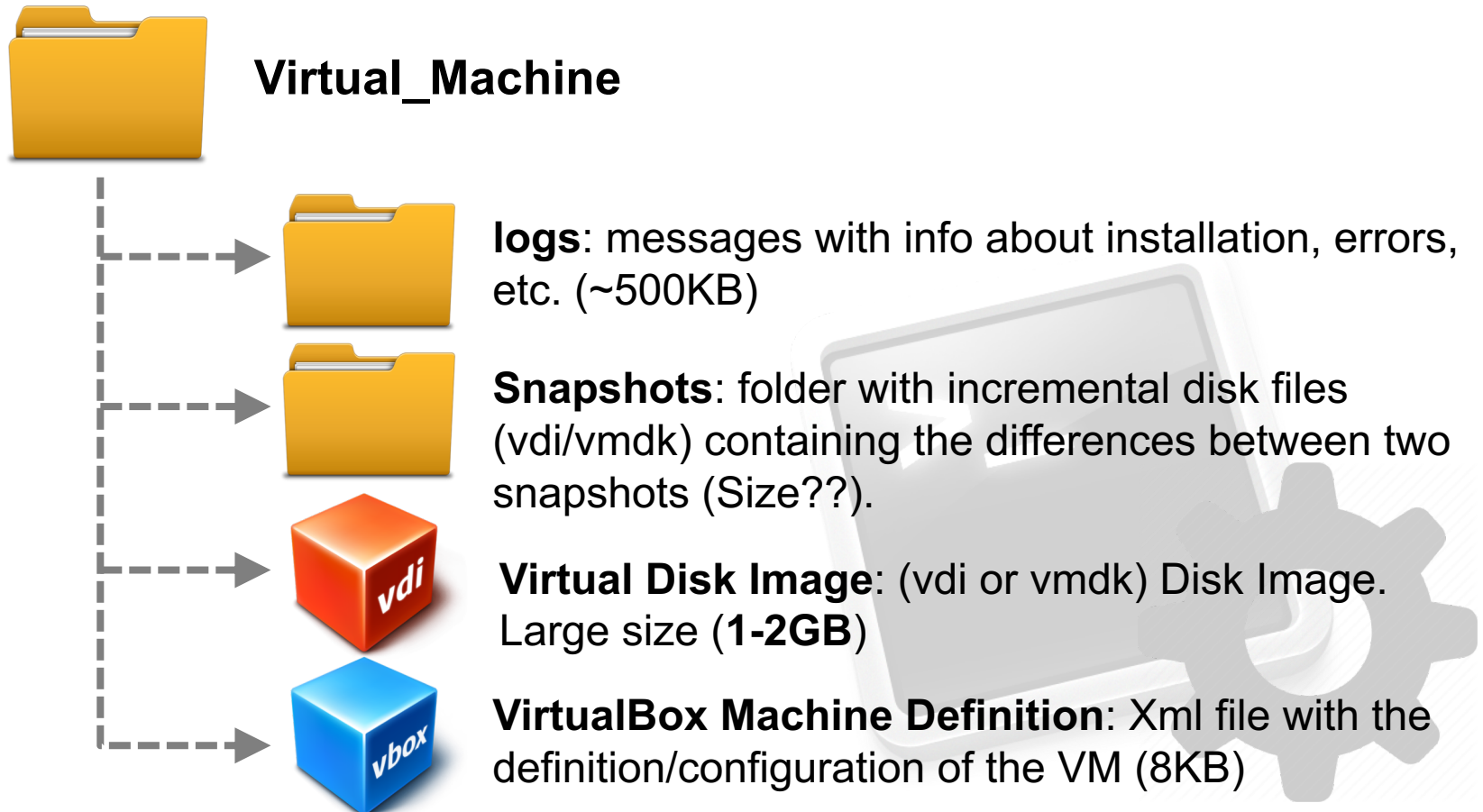
Assignment 1: Course VM

- **Migrating a Virtual Machine between two PCs**
 - Useful when working simultaneously at Lab and at home
 - Also useful to prevent HW failures (what if your laptop breaks?)



Assignment 1: Course VM

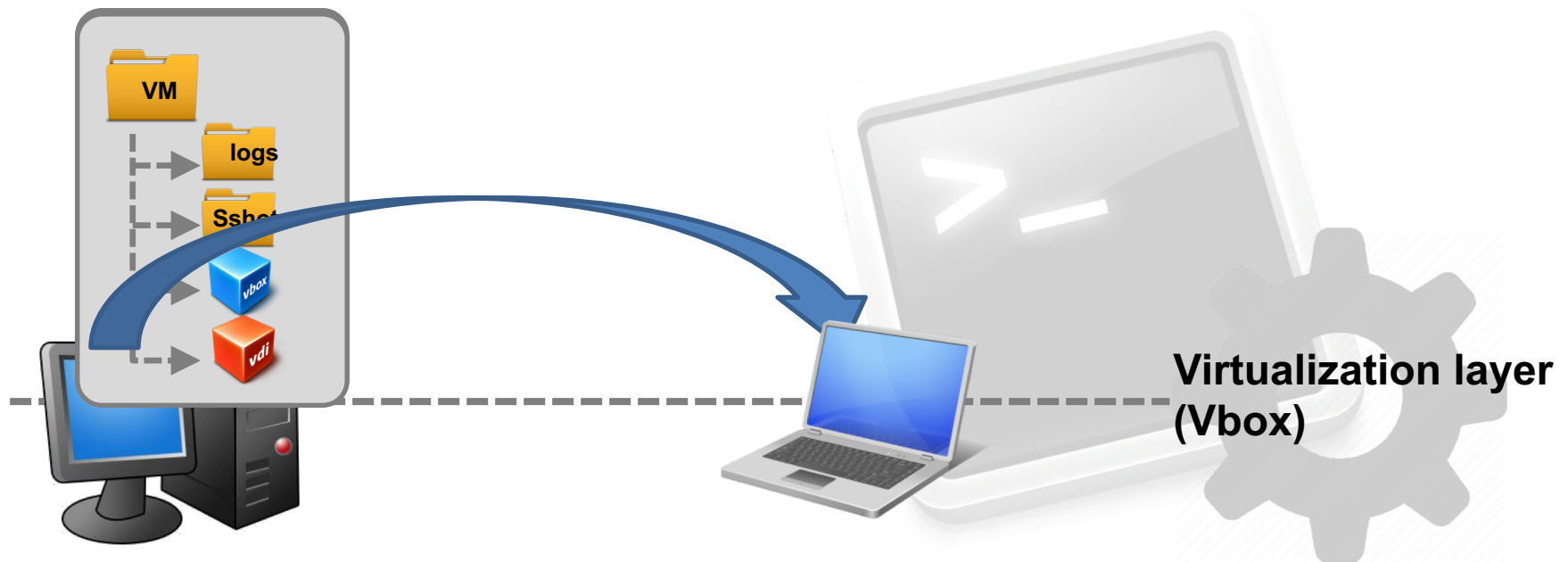
- Folder organization for a Virtual Machine in Vbox:



Assignment 1: Course VM

- **Step 1: Replicate the Base VM**

- We must copy all the VM files from one PC to the other. This way, both PCs have the same initial image.
- Large amount of data, but fortunately this only has to be done once.



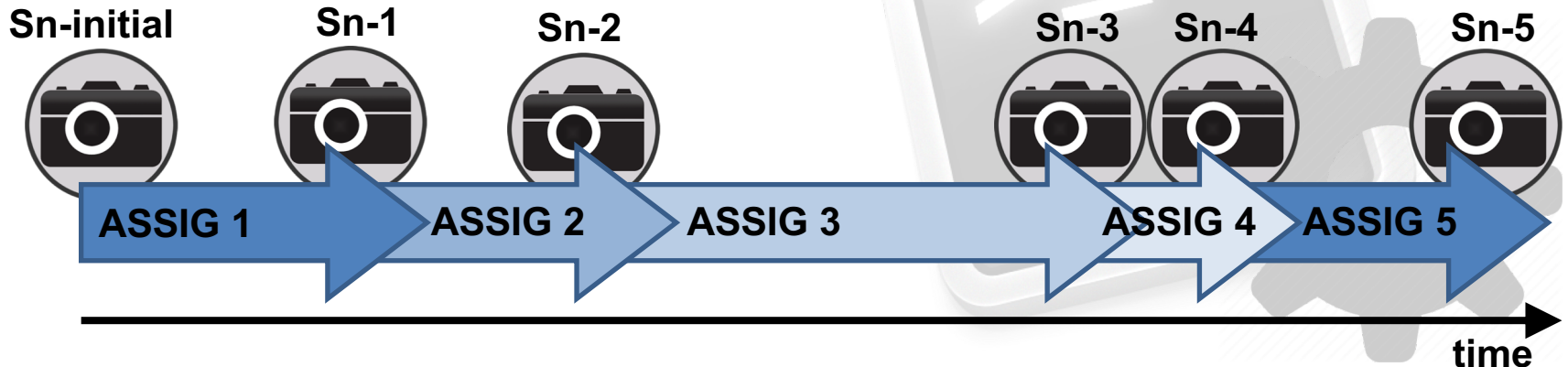
Session Index

- preparation: Lab & Virtualization
- Assignment 1: Course VM
- **Assignment 2: Snapshots**



Assignment 2: Snapshots

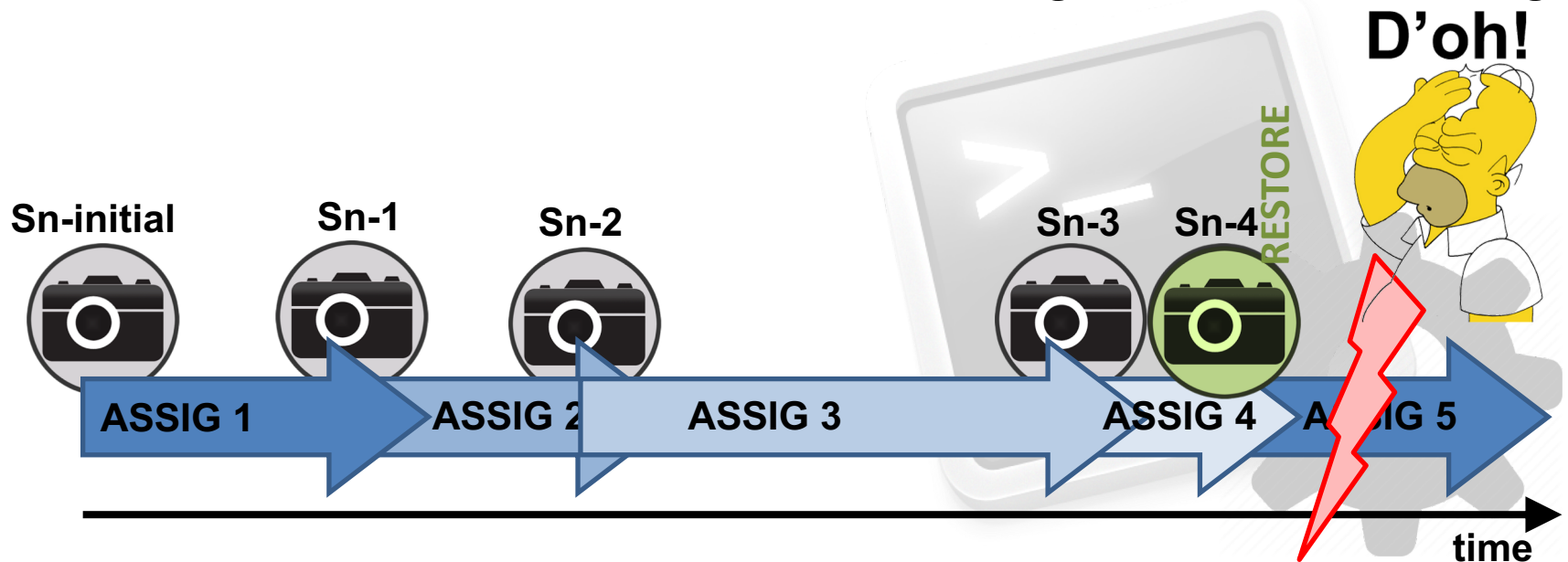
- Could be defined as a “photograph” of the Virtual System state at a certain moment, stored in disk by Vbox.
- **Creation:**
 - You can generate a copy of the current state whenever you want.
 - If you create a snapshot when the machine is running, Main memory state is also copied to disk (<< snapshot Size)
 - Advice: Always create snapshots after turning off the machine.



Assignment 2: Snapshots

- **Restore:**

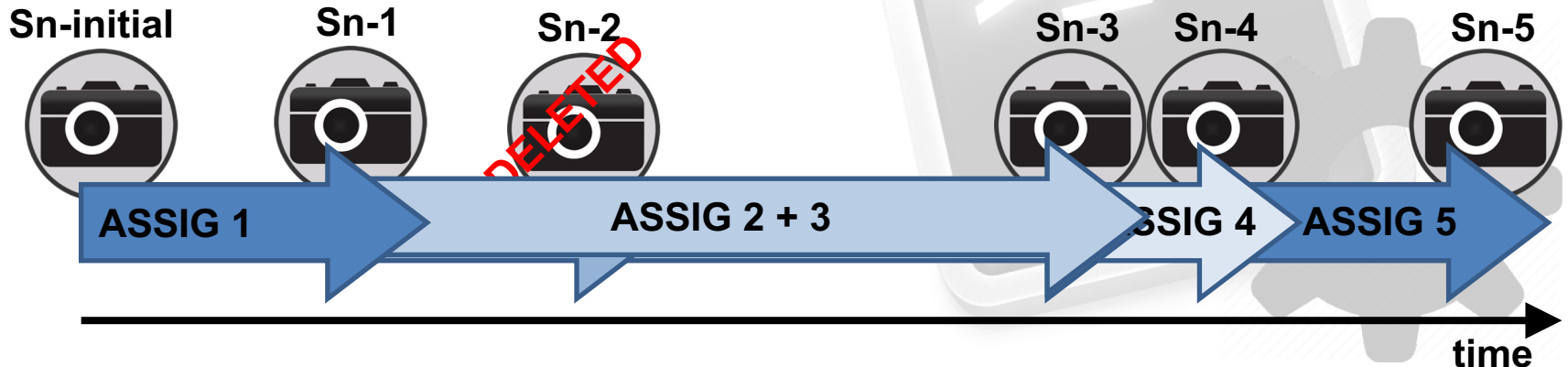
- Restoring means going back in time. Any change made after a snapshot can be reverted.
- The snapshots store incremental changes (in separated files)
- The initial state can be restored eliminating the differential changes



Assignment 2: Snapshots

- **Removing snapshot:**

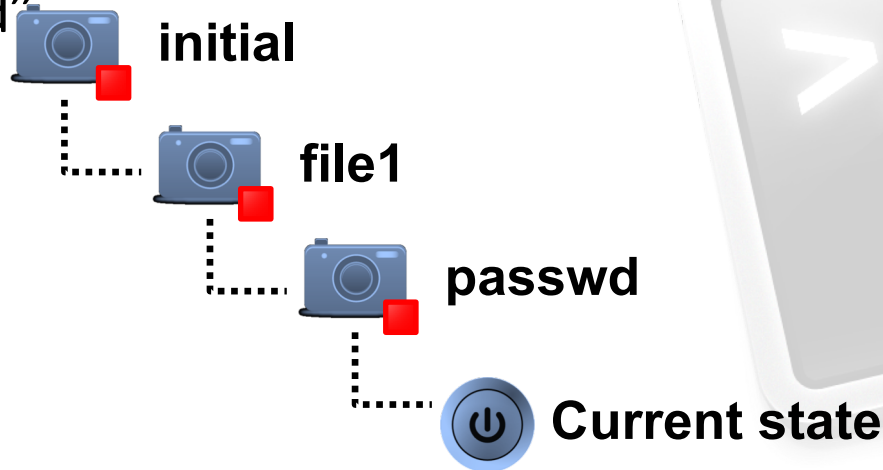
- Removing an intermediate snapshot does not affect Virtual Machine state, it only frees host files that Vbox employed to store data about that snapshot.



Assignment 2: Snapshots

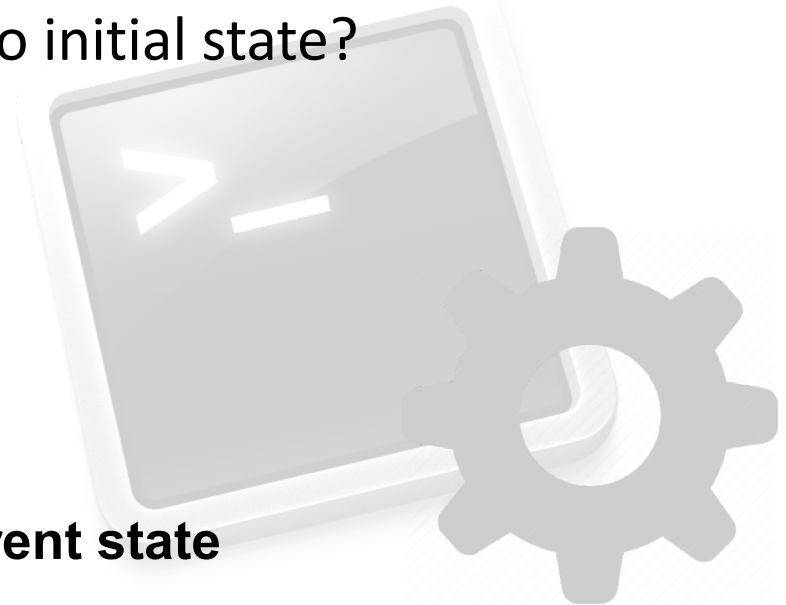
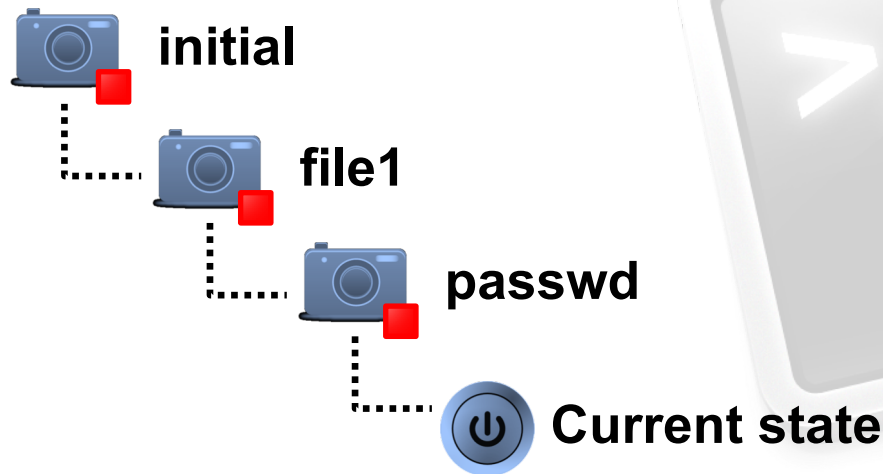
- With your VM turned off, create a snapshot named *“initial”*.
- Switch on your VM, and create a file with the following command:

```
cat /proc/cpuinfo > file1
```
- Turn off the machine and create another snapshot: *“file1”*
- Switch it on again and run the command `passwd` to change your user password. Switch it off and create a snapshot named *“passwd”*



Assignment 2: Snapshots

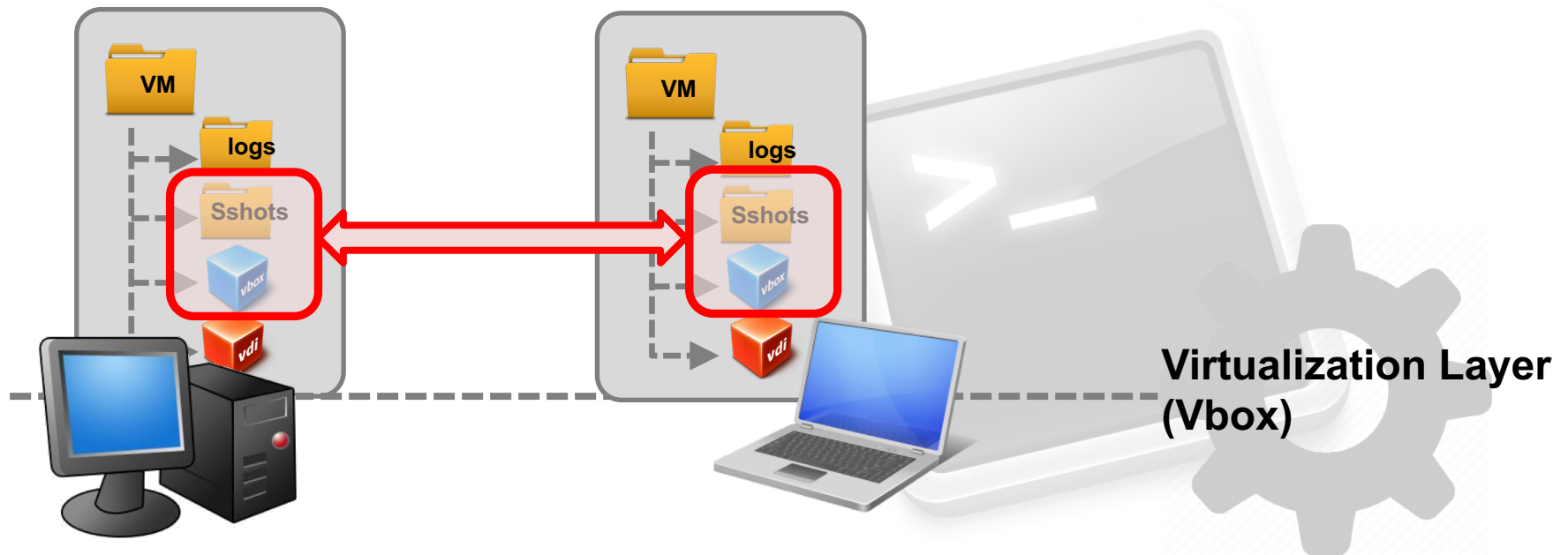
- Remove the snapshot “file1”. After that, check out what happened with the file *file1* if we restore the snapshot passwd. Can you find that file?
- Finally, restore the initial state of the machine. Check that the password has returned to its previous value. What happens with snapshot passwd after restoring to initial state?



Assignment 2: Snapshots

- **Step 2: Migrating your work between hosts**

- Once the initial copy has been made, only the migration of a few files is required to maintain the same state in both hosts.
- Procedure: Work in lab → Create snapshot → Copy [.vbox + Snapshots] → Overwrite these files in laptop → Keep on working...



Assignment 2: Snapshots

- **Migration test**

- Let's try to migrate the VM prepared for this course. You don't need to perform step 1 in this case (You all have the same base machine installed). On your PC, switch on the VM of the course and create two new folders (mkdir), labeling them with your first and second surnames. Switch off the VM and create a snapshot.
- Copy the required files in a pendrive and exchange the PC with your classmate.
- In your new PC, overwrite the files with the ones in the pendrive, switch on the VM and check if you are able to see the folders created previously.

