Swansea University
Department of Computer Science

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October 3-7, 2022

CSC385/CSCM85 Modelling and Verification Techniques

Lab 0

Getting started

In this lab you learn how to use basic Linux commands, create and edit a file using the text editor Emacs, and load and run a CSP-file in the modelling tool FDR which we will use to model and analyse security protocols.

The syntax and semantics of the process language CSP (Communicating Sequential Processes) will be taught in subsequent lectures and labs.

It is assumed that you work with a Linux computer in the Lab, CoFo 204. However, if you wish to use your own laptop, see the last section first.

The lab tasks below should take less than 30 minutes.

Task 1.

Open a command tool by clicking on the icon at the bottom of the screen.

Create a directory called `verification` by typing in the command tool the Linux command

```
mkdir verification
```

Move into that directory by typing

```
cd verification
```

Basic Linux and commands (some of which you should try out) can be found at

```
https://ic.unicamp.br/~mc102/downloads/Linux_Reference_Card.pdf
```

Task 2.

Open the text editor Emacs by typing in the command tool

```
emacs&
```

Click on the Emacs window that pops-up and use the menu to create a new file called

```
day.csp
```

The name `day` is arbitrary, but the extension `.csp` is important.

Write the following code into that file (`--` begins a comment):

```
-- My first CSP file

channel sleep, eat, work

DAY = eat -> work -> sleep -> DAY
```

Save your editing using the Emacs menu.

Hint: You may find it more convenient to use commands instead of the menu. A reference-card with the most frequently used Emacs commands can be found at

```
https://www.gnu.org/software/emacs/refcards/pdf/refcard.pdf
```

Task 3.

Open the modelling tool FDR (Failure Divergence Refinement - the name will be explained later) by typing in the command tool

```
fdr4&
```

In the window that pops-up use the menu to open (or load) the file `day.csp`. (At first use, you may be have to choose the academic licence option.)

Type in the FDR window

```
:graph DAY
```

You will see a graphical display of the process `DAY`.

Edit the file, by adding another `eat` action after `work`. Save the edited file in Emacs, and reload the file in FDR. You may type `:load day.csp` instead of using the menu and you may repeat commands using the uparrow key. Now repoeat the command `graph DAY` and observe the change. Invent another cyclic process, implement it (in the same file), and display its graph.

Running on your own devices

If you want to use FDR on your laptop, you can download it for free from

```
https://cocotec.io/fdr/
```

FDR is available to run on any modern Windows and MacOS device, including Windows 10 and 11, and on Apple Silicon. This means you can use your own laptop during labs. However, Emacs is likely not installed on your device. You may use your preferred text editor instead. It must be capable of saving plain text files, rather than documents like `.docx` or `.rtf`. We recommend text editors such as Sublime Text, VS Code, or Notepad++ if you are unsure what you should be using:

```
https://www.sublimetext.com/
https://code.visualstudio.com/
https://notepad-plus-plus.org/
```

These are also available on Linux, and can be used instead of Emacs. However, they are not installed on the Linux machines in CF204, so you will have to install these yourself if you wish to use them. They all follow typical keyboard shortcuts, so are easier to learn. Emacs is available by default on the Linux machines in CF204, and can be learnt from the reference-card given.

On non-Linux machines, you will likely open the text editor and FDR outside of the command tool. The commands to make and enter a directory are the same on Windows and MacOS, however other commands may not be.