

### Task 1

- For this course, you will need a computer that runs Linux.
- Even a very old computer would do.
- If you have no experience in Linux, there are several options for you:
  - If you think you can allocate a computer entirely to Linux; download and install **Linux Mint Debian Edition**.
  - If you want to have both Linux and your older system on the same machine, these are the options:
    - Virtual machine:** First install **VirtualBox**, this will enable you to install Linux on a virtual machine, a computer that does not exist physically but is simulated by your computer. The simplest way would be to download the **LMDE-32bit virtual machine** prepared for this course and import it into VirtualBox. This is a virtual machine with a pre-installed **Linux Mint Debian Edition** and with all the required software for the course. For the download to work, you may need a **vpn service**, if you are connecting from outside of METU.
    - Dual boot:** In this option, you are asked to choose the operating system (your old system or Linux) during startup; to change systems you need to reboot your computer. The details of how to construct a dual boot system is machine dependent.
    - Live usb:** You install Linux on a usb flash drive. You boot your computer from usb and use Linux. If the first two options doesn't work for you, this is the option to pick.
- If you are experienced in Linux, but new to Debian-based Linux and want to switch, install **Debian** rather than Mint Debian Edition.

### Task 2

- Once you import the machine, start it up and login as guest – the password is cogs502.
- If you see the desktop, than that's it, you've completed this task.
- If you experience any problems up to this point, feel free to get help from the class by posting to the **newsgroup**.

### Task 3

- For programming you will need to edit source code.
- For this you will need a text editor.
- vim and emacs are very powerful editors, but they need some patience and effort to get used to.
- For simpler but good editors you can try geany and sublime – the latter is invoked by the command `subl`.
- Try and pick one of these; and make sure that you can type text, save it and open the same file later.
- Solve the following question; write your answers to a text file; save it under the name `a01-<your surname>.txt` and send to [umozge@metu.edu.tr](mailto:umozge@metu.edu.tr) with subject line: cogs 502 assignment 01.

### Task 4

We usually write operators between operands (infix notation):

$$6 \times 4$$

In this notation you need to explicitly state the order of application of operators, using parentheses and/or defining operator precedence conventions. For instance, without any such convention:

$$6 \times 4 + 3$$

is ambiguous between a complex operation yielding 27 and another complex operation yielding 42. You need to use parentheses to indicate which is intended.

The prefix notation (or the Polish Notation) invented by the mathematician Łukasiewicz places an operator before its operands rather than between them. For this notation, the following equivalences hold:

$$\begin{aligned} 6 \times 4 &\equiv \times 6 4 \\ (6 \times 4) + 3 &\equiv + \times 6 4 3 \\ 6 \times (4 + 3) &\equiv \times 6 + 4 3 \\ (18/6) - (4 \times 81) &\equiv - / 18 6 \times 4 81 \end{aligned}$$

Give all the possible parenthesized forms of the following:

- (a)  $3 + 5$
- (b)  $3 + 5/2$
- (c)  $3 + 5/2 \times 1$

Convert the following operations to prefix notation (give all the translations for ambiguous forms):

- (a)  $3 + 5$
- (b)  $(3 + 5)/2$
- (c)  $4 + (1 - 7)$
- (d)  $x + ((y - z) \times w)$
- (e)  $(x + y) \times (z - (w + t))$
- (f)  $(3 \times (7 + 21)) - ((3 \times 7) + 21)$

Convert the following operations to infix notation:

- (a)  $- + x y z$
- (b)  $+ x - y z$
- (c)  $\times - t + x - y z t$
- (d)  $+ 7 - 9 / 2 3$
- (e)  $\times - 9 + - 3 42 \times 7 5 2$