CSCI 1108
Introduction to Experimental Robotics

Software environments for robotics and Simulator
Aseba Studio

Robotics Software Environments

• Ubuntu (Unix OS)

• ROS (Robot Operating System)
  www.ros.org
  Subscription architecture, wide range of services, many robots have ROS nodes

• OpenCV (Open Computer Vision)
  opencv.org
  Most commonly computer vision package
Robotics Simulators

• Physical robots have traditionally been expensive and often require careful handling (safety)

• A common way in robotics is therefore to use programs that simulate the physical behaviour of a robot.

• Simulators are useful for initial development, but roboticists always stress their limitations
Example of open source simulator
If you are starting to program, please follow the first tutorial carefully and please ask questions if things are not clear. While this is not a programming course itself, it is a nice way to start programming with a simple programming language and the basic concepts of programming should be easy to learn (still means you might have to spend some time with it as it is different to a natural language).

Hint: The learning centre should be a good place to get individual help, and of course do not hesitate to ask your TAs and Instructors.
Loops in Aseba

A loop is a basic operation in a programming language to allow repeated execution of some code. In Aseba it has the form (syntax)

```plaintext
for name in first:last do
    code
end
```

When the interpreter comes to the “for” keyword it invokes the following “microprogram” (internal set of instructions):

1a. Set running variable `name` to the value specified in `first. (only first time)`
1b. Increment name by one `(name=name+1)` (if not first time)
2. Check value of variable `name`.
   2a. If `name<=last` then execute code and go to 1b
   2b. If `name>last` then leave loop and execute code after end statement.
Conditional statements in Aseba

A conditional statement is a specific code to direct an operation in different directions depending on logical statements such as ”if a variable is larger than a certain value then do something else do something-else. In Aseba it has the form (syntax)

```plaintext
if name > value then
    code
end
```

When the `interpreter` comes to the “if” keyword it evaluates the logical statement (here if the value in variable `name` is larger than the value of variable `value`). If it is true it executes the code. If not it continues after the end statement.
Data in Aseba

• **Variables**

  `var name`  
  Regular placeholders for numbers (basic data type)

  `var list[]`  
  Lists: If we want to refer to specific values in a collection of data, we need basic construct for data collections. One of the most basic constructs is a list. Later you learn more about advanced data structures like arrays, trees, etc

• **Constants**

  Constants are special variables that should not Change during the execution of a program
var i = 0
var a[3] = [11, 22, 33]

for i in 1:3 do
    a[i] = a[i-1] + i
end