GNU FC2D user and developer manual

A User's Guide for GNU FC2D
July, 2012

Fabio J. Gonzalez gonzalfj@ymail.com

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1 Introduction

GNU FC2D is a highly versatile programming language, that support two temporal dimensions. This programming language focuses on the creation of dynamic programs. In this text, I will introduce you to, temporal dimensions theory, and how to implement it, in pseudo-code. Before you start, you is required to understand some basic concepts. In a zero-dimensional world, all geometry, is limited to a single point(can no exist). If we duplicate this point and connect it with one point outside it's worlds, and adjacent to it, we have one-dimensional geometry. {*[GONZALEZ C G] The point movement generating space*]} When we do the same, in a 2D space, we have three-dimensional geometry (see Figure 1.1) . The temporal dimensions theory, comes with the intuitive visualization of time as geometry.

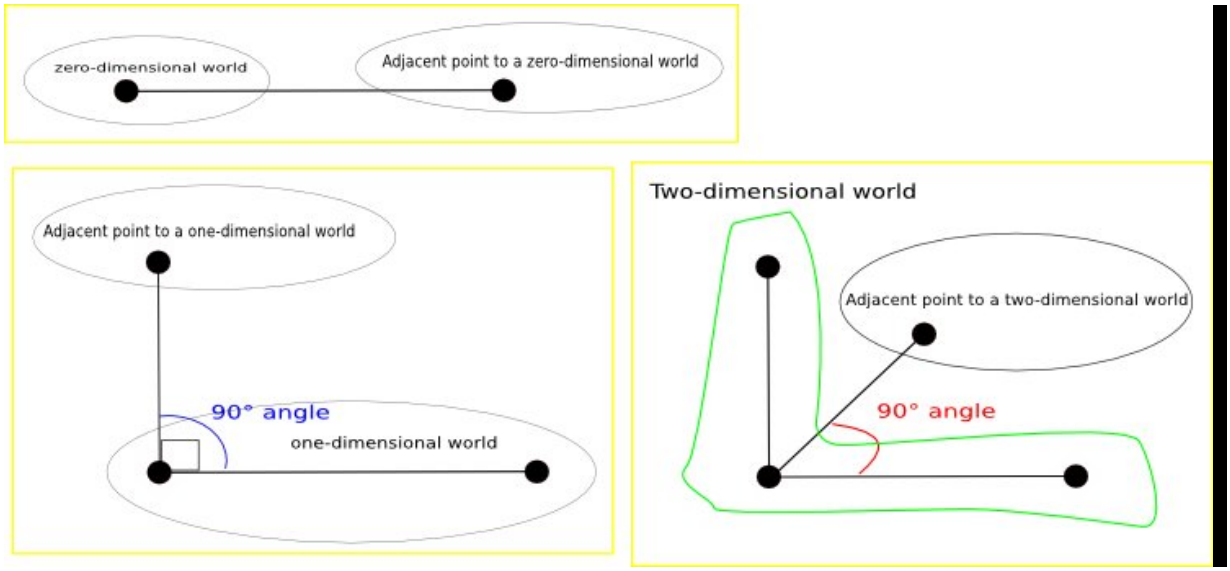

Figure 1.1: An example of spatial dimensions.

It's likely you've seen a segment being used to represent time. In a geometric visualization of time, each point, represents a condition that is true or false, and no more. The program trajectory always is a one-dimensional line. When I say this I mean the steps of the program when executed

(see Figure 1.2)

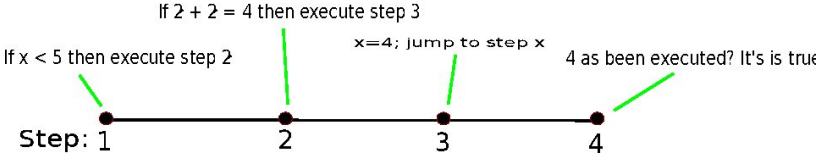

Figure 1.2: Geometric visualization of time.

With two temporal dimensions, resume events to points, that is, conditions that are true or false, is a impossible task. But despite that, given a finite time(A program terminates execution in finite time), we can project a 2D time, in a 1D line, and it is a *two-dimensional program*. The result of it's procedure, is a totaly new program, derived from knowledge obtained, during execution of all program contents, and not a singly step. For each condition the program is cloned in memory, and re-executed, but, in next execution, the variable *level* is equal to *this level*+1. And we test the condition passing it as true. The original program is what has *level* zero. We do the same for sucessive program, but all conditions, that we are testing are true in the tests. If we write a file, we test whether the level is zero, if the level is greater than zero, write in a memory clone of file. Only if the level is zero write directly to the file. The way I use to get this, is by using the conditions:

if never in a function
: We setup structure that represents, unknown `if`, to true. Re-execute the program, testing in each step, that change variables values. If the condition is true, and we are testing inside, the proposed function, we setup the structure that represents, unknown `if`, to false.

if always in a function
: We setup structure that represents, unknown `if`, to true. Re-execute the program, testing in each step, that change variables values. If the condition is false, and we are testing inside, the proposed function, we set up the structure that represents, unknown `if`, to false.

if sometime in a function
: We setup structure that represents, unknown `if`, to false. Re-execute the program, testing in each step, that change variables values. If the condition is true, and we are testing inside, the proposed function, we set up the structure that represents, unknown `if`, to true.

This procedure represents only a single step of a *two-dimensional program*. This is a very realistic position, because our universe have a single, temporal dimension, then we not have a next moment. The implementation of a `while` loop is trivial. At end of `while` block, if the `while` loop condition, not is true, then jump to begin of `while` loop block. We know that the next moment of time, in a two-dimensional time, is a not performed reality. This theory, perfectly describes our work, because, only way, to modify state of a 2D `while` loop, is changing, the program (Consider variables as part of the program), then is highly convenient, for automaticaly generated programs.

2 Developing GNU FC2D

Before all, we analyse the *if sometime in a function* procedure, in a single thread application, because it is more easier. The *if sometime in a function* procedure, more rarely left the program in a cycle with duration of infinite time.

1. Checks shared memory and see if it is a child process. If it is true, between each pair of instructions, put code, to run step 4, in the specified `function`.

   Scans next instruction and try execute it. If no have next instruction, then `return`
2. If it is a `if sometime in function` condition. Then go to next step, otherwise, go to previous step.
3. Using shared memory(or something similar), notifies child program, to test condition in shared memory(you can use a stack for this job). Variable `level` is in shared memory. `level = level + 1`. Clone this program and execute it as child process(you can use `fork()` for this job), and wait it ends. `level = level - 1` and Go to step 1.
4. Check condition specified in shared memory. If it is true, set shared variable, to true and `return`.

Algorithm 2.1: *if sometime in a function* procedure

In practice, implement it is more complicated. Probably you need a stack and you need in some time, move data from stack to local(not shared, it is for this process only) variables. The stack is used to pieces of code, containing conditions to test. Each program execution test a single condition, but, it can dispare other execution(as you see in pseudo-code). You can see also, it's recursion.

3 Solution to temporal paradoxes

Think about grandfather temporal paradox, I go back in time and kill my grandfather, before he have some child. Then I never, have existed and I neven kill my grandfather.

Like geometry, we can visualize it easily, subtracting one dimension of problem. It is like thinking: if condition is true, then the same condition at same moment(of course, no exist time 1D) is false.

We can see, if the same object as two different states, can not be at same time. Then in a 2D-time world, if have two distinct temporal lines, it's not can be exist at same time. Then if I modify the time, is contradictory think, that I can change my own past, present and future, but, can exist a 1D temporal line, that the past, present and future as been changed. From deterministic point of view, moments can be deducted, from it's past. Then from deterministic point of view in a 2D-time, our past, present, and future, can be deducted from others temporal lines, that is the past in 2D-time world.

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Version 1.1, March 2000

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