Computational Logic Lab 13/10/202

**First exercise**

1. Delegare they constant p and q

(declare-const p Bool)

1. Asset

(assert (=> p q))

(assert( not (and p q))

Important to have a good editor, notepad++ or visual studio code

Atom for Apple

1. Check

(Check-sat)

1. Model

(get-model)

It is important to write everything correct

Better running piece to piece, it is easier to find mistakes

To show that there is more than one model, one possibility is to negate assignment

Also use copy like p1 and q1

How to run:

1. Open a terminal (windows cmd, open command prompt)

2 possibilities:

1. If z3 is in the path of the system (application can be launched in any condition) it is ok in labs
   1. Type z3 and take the icon and put in the cmd
2. If z3 is not in the environment variable
   1. move the wheel where there is the shell z3/bin find the executable .exe

**Exercise 2**

Check tautology

1. Declare constant p and q

Put **not** at the beginning

(Declare-const p Bool)

(Declare-const q bool)

(Assert (**not**

Give **unsat** as answer

If you use ↑ on the keyword it will repeat the same command

**Exercise 3**

1. Declare propositional variable Italy1 Italy2 Italy3 (Italy have color 1, color 2, color 3)
2. Same with France, Switzerland, Austria and Germany
3. Check with 2 Colors, should give unsat
4. 15 variable to be declare
5. Every nation need to have only 1 color, exactly 1 should be between Italy1 Italy2 Italy3
6. XOR3 it is a macro,
7. (assert (xor3 Italy1 Italy2 Italy3)) the tool have to consider only 1 color
8. Don’t want neighbour country to have the same color
9. France and Germany should not have same color
10. ¬ (Germany1 ^ France1)
11. ¬ (Germany2 ^ France2)
12. ¬ (Germany3 ^ France3)
13. Assert with the z3 languge,
14. Once finished run (check-sat) and (get-model)

Give sat (so the problem have a solution) and the answer

If get unsat and ask for get model you will get an error

**Exercise 4**

Schedule lectures C L P H A only 3 times 9am 10am 11am

Accomplish conditions

Student X wants to attend C H A (can’t put in parallel those lessons, don’t care about X)

Student Y want to attend L and P

Student Z want C H but not before 10

C H A not 9 10 11

L P not 9 10 11

C H 10 or 11

Answer: give the solution it is sat

H10 is true