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1. What is PyB

PyB is a B implementation written in python. More informations about B: http://en.wikipedia.org/wiki/B-Method

It requires java and python 2.7

2. Use PyB

checking mode:
No animation. Evaluate properties, assertions and invariant clause in the first state. Missing cluases are omitted.
python pyB.py **-c** <Filename>

read eval print mode:
evaluate prediactes and expressions in repl.
python pyB.py **-repl**

animation mode:
Interactive step by step execution of operations and statements. Set up constants and initialization are separate steps.
python pyB.py <FileName>

evaluate given state (second tool chain). Executed set up constants and initialization using values from solution file.
python pyB.py **-c** <FileName> <SolutionFilename>

experimental stand alone model checking:
python pyB.py **-mc** <FileName>

be sure your PYTHONPATH is set.
Single predicates and expression files need #PREDICATE / #EXPRESSION at the first line

3. Flags and Switches

modify pyB/config.py:

3.1 ENABLE_ASSERTIONS:
        values: True, False.
        summary: evaluate assertions clause (e.g. in checking mode)

3.2 BMACHINE_SEARCH_DIR:
        values: any file path.
        summary: search dir of included, extended, used and seen machines

3.3 PROPERTIES_TIMEOUT:
        values: double greater than zero
        summary: timeout for a subpredicate eval. In properties clause

4. Modify PyB

Parser modification:
1. Check out the gradle build tool from the gradle from http://gradle.org
2. Modify Main.java and ASTPython.java and move them in the subfolder src/main/java/pyB
3. Run build.gradle file from the project root. On mac os:

$ **PATH=$PATH:<YOUR GRADLE PATH> gradle uberjar**

The output looks like this:

:compileJava UP-TO-DATE
:processResources UP-TO-DATE
:uberjar UP-TO-DATE

BUILD SUCCESSFUL

Total time: 4.737 secs

4. A File javaparser.jar has been created in /build/libs/.
5. The Java Parser can be tested on mac os by

$ **java -jar build/libs/javaparser.jar input.txt**

input.txt must contain a B-machine or a B-predicate / B- expression beginning with #PREDICATE or #EXPRESSION. E.g #PREDICATE
1<2

6. Move the jar file to <PYB PATH>/jars/ to use it with pyB or modify the path in config.py

C translation using PyPy tool chain:
$ python ../pypy/rpython/translator/goal/translate.py <File>

5. Supported Syntax

More informations at ClearSY - B LANGUAGE REFERENCE MANUAL (VERSION 1.8.6)

url: http://www.math.pku.edu.cn/teachers/qiuzy/fm_B/Atelier_B/B-manrefb1.8.6.uk.pdf

Python-Version:

propositions, quantified predicates, equality predicates, inclusion predicates, integer comparison predicates, boolean expressions,
arithmetic operators, maplets, set operators, default sets (e.g NAT, BOOL), set operators, records, structs, relations, relation operators,
iteration and transitive closure*, functions, function operators, sequences, sequence operators, substitutions, clauses

missing features:
 (?) $0 specific value(5.1 page 38)
 (?) character string
 trees (5.20. page 72)
 values clause
 refinements, implementations
 Event-B

* implementation similar to ProB

C-Version:

More informations at tests/test_pypy_translation_objects.py

simple arithmetic, integer comparison predicates

6. Translate to C using PyPy

1. Switch USE_RPYTHON_CODE and USE_RPYTHON_POPEN flags in config.py to True.
2. Install pypy in PYPYDIR
3. execute on console: PYTHONPATH=<PYPY_DIR>:. python ../pypy/rpython/translator/goal/translate.py --batch pyB_Rpython.py
        from pyB root with PYPYDIR = pypy install folder
4. execute on console: ./pyB_Rpython-c <BMACHINE>
        from pyB root with BMACHINE = path to B machine file

~ **321.60 seconds needed**