

# IRT Tutorial v.1.0.0

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Project URL: <https://github.com/ddnexus/irt>

*Sometimes, there are things that are simple to do, but not so simple to explain... at least for me :-). This is the case of this tutorial: what takes a lot of text to be explained, will take just a few seconds to be executed when you learn the trick, so don't worry: IRT is really fast and easy to use despite the 20 pages of this tutorial.*

*You will not have to write test classes and methods to test your code: you will have just to play with it as you already do with irb. When some test will fail in the future, IRT will automatically open an irb session at the failure line, giving you immediate feedback and in place editing for fast and easy fixing.*

*You will learn how to work with IRT with a deadly simple class (just to avoid to get distracted by the code). Some steps could seem trivial or useless in this context, but they will be useful when you will have to deal with real word applications, specially Rails applications.*

*The first principle to learn with IRT is that you should start to use it as soon as you write your very first lines of code for any project. You can use IRT as you use irb or the Rails console... to try your code on the way. The only difference is that you have a lot more features and tools at your disposal, and if you use them properly, when you will have done with your code, you will have done with your tests without any added effort.*

*So let's start from the beginning...*

## Your first project with IRT

Create a dir named 'irt\_tutorial' and create the 'irt\_tutorial/person.rb' file with this content:

```
class Person
  attr_accessor :name, :surname
  def initialize(name, surname)
    @name = name
    @surname = surname
  end
end
```

Now cd to the 'irt\_tutorial' dir and launch irt with the path of a new file:

```
$ cd irt_tutorial
$ irt test/person.irt
```

Answer 'y' (or <enter>) and IRT will create a new directory 'test' with the 'person.irt' file in it, containing just one statement 'irt', then it will run the file.

### Suggestion

Creating new files and dirs with IRT and running multiple files in nested dirs is very easy by design. Put just a few (consistent) tests in each file and create new files often. Many small nested files are more maneagable than a few big files...

### Notice:

- The 'irt' statement (without any argument) is a directive that makes IRT switch from file mode to interactive mode: you can use it whenever you want to open an interactive session at any given line in a .irt file.
- During the development process, you will typically leave it at the end of your test files, so IRT will open an interactive session after running all the code in the file. You will remove that when you will finish adding tests.

## Adding your first test

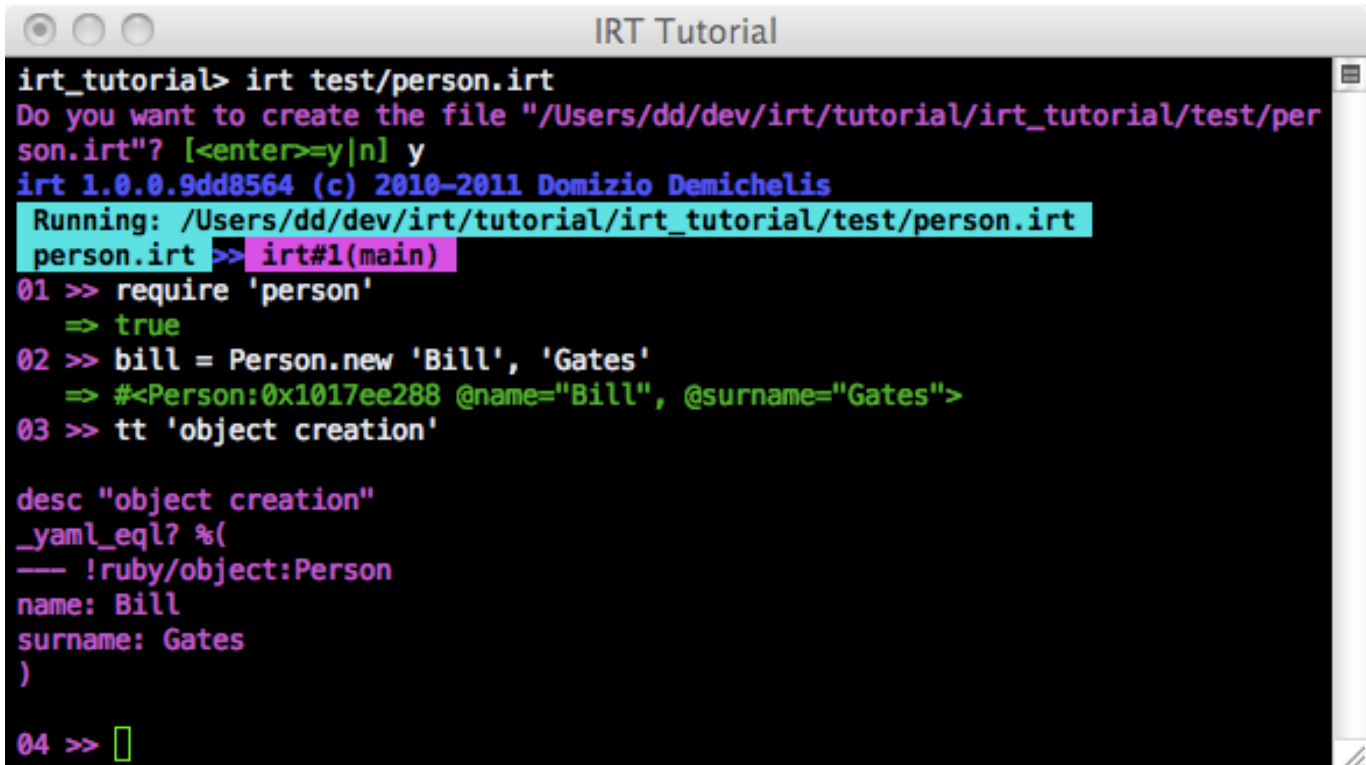
Use your console as a regular irb console and create an object with your Person class:

```
>> require 'person.rb'
>> bill = Person.new 'Bill', 'Gates'
```

The object 'bill' looks OK, so let's add a test ('add\_test' or 'tt') checking for that value:

```
>> tt 'object creation'
```

Now you should see something like this:



```
IRT Tutorial
irt_tutorial> irt test/person.irt
Do you want to create the file "/Users/dd/dev/irt/tutorial/irt_tutorial/test/per
son.irt"? [<enter>=y|n] y
irt 1.0.0.9dd8564 (c) 2010-2011 Domizio Demichelis
Running: /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt
person.irt >> irt#1(main)
01 >> require 'person'
=> true
02 >> bill = Person.new 'Bill', 'Gates'
=> #<Person:0x1017ee288 @name="Bill", @surname="Gates">
03 >> tt 'object creation'

desc "object creation"
_yaml_eql? %(
--- !ruby/object:Person
name: Bill
surname: Gates
)

04 >> []
```

**Warning:** If you don't see any color in your console, you are probably on a Windoze system. Please read "ANSI Colors" in the README file in order to fix it.

As you see the 'tt' (or 'add\_test') generated a few lines containing the description of the test, and the test itself, which may look a little weird: don't worry about that, it is simply a directive with the serialization of the last value (the object 'bill' in our

case) that tells IRT to test that value. You will copy and paste it into the 'person.irt' file... in just one step, but first, let's take a look around.

Type 'log' or just 'l' in the console:

The screenshot shows a window titled "IRT Tutorial". Inside, there is a "Virtual Log" section with a list of entries. The first entry is "person.irt" with a line number "1". Below it, the entry "irt#1(main)" is shown with a line number "1". The log entry for "irt#1(main)" contains the following code:

```
1 require 'person'
2 bill = Person.new 'Bill', 'Gates'
3 desc "object creation"
3 _yaml_eq1? %(
3   -- !ruby/object:Person
3   name: Bill
3   surname: Gates
3 )
```

Below the log, there is a console session. The prompt "person.irt >>" is followed by the command "irt#1(main)". The console prompt "05 >>" is shown at the bottom.

#### Notice:

- The Virtual Log Tail shows you the latest lines of what is relevant to your testing and where it comes from (file or session), complete with its reference line no.
- The 'tt' command has been invoked at line 3, and has produced a few lines, which all refers to line #3).
- The last hunk - titled 'irt#1(main)' - is what you should add to the 'person.irt' file if you want to reproduce (and test) automatically what you just did in the interactive session.

Don't worry about all that line numbers in the way. You don't have to copy that from the log: the log is just a graphical representation of what has happened at any given time in your execution, that gives you an easy feedback at the touch of a 'l'. Depending on your OS, you have a few better ways to copy the last lines to the file.

## Copy the session lines

The easiest way to copy all the session lines is using a combined copy-open command, that will fill the clipboard with the lines and will open an editor, possibly at the current evaled line. You can try the commands: 'cnano' (or 'cnn') or 'cvi' to copy the lines and open the file in place with nano or vi. You can eventually use 'cedit' (or 'ced') to copy the lines and open the file with your default GUI editor.

Just try them, and if they don't work yet (you will read the documentation to fix that) you can use other options to do the same.

You can use 'copy\_lines' (or 'cl') and then manually switch to your preferred editor where you will paste the lines, or if that doesn't work yet, you can use 'print\_lines' (or 'pl'), select and copy the lines from the console, then use 'nano', 'vi', 'edit' or manually switch to your preferred editor and paste the lines.

But let's suppose you are not lucky today, and that you have to print the lines, copy, switch and paste manually. Start with typing 'print\_lines' (or 'pl'):

```
>> pl <select><copy> <switch><paste>
```



```
05 >> pl

require 'person'
bill = Person.new 'Bill', 'Gates'
desc "object creation"
_yaml_eql? %(
  — !ruby/object:Person
  name: Bill
  surname: Gates
)

06 >> 
```

### Notice:

The test lines outputted by a 'tt' command, and the last lines printed in the console starts and ends with an empty line for easy select (just click on the first empty line and drag till the last empty line)

Now, your edited 'person.irt' file should look like this (below you can see the 'cvi' screen after the paste: we have just added a couple empty lines for better readability):

A screenshot of a window titled "IRT Tutorial". Inside the window is a text editor with a dark background and syntax-highlighted code. The code is as follows:

```
require 'person'
bill = Person.new 'Bill', 'Gates'

desc "object creation"
_yaml_eq? %(
  --- !ruby/object:Person
  name: Bill
  surname: Gates
)

irt
:wq
```

The cursor is at the end of the last line, after the colon and 'wq'. The window has standard macOS window controls (red, yellow, green buttons) in the top-left corner.

Notice:

- The ':wq' in the last line is just the vi command for write and quit).
- We leaved the 'irt' directive at the end of the file, so IRT will open an interactive session after the execution of all the other lines, so we can continue to add other tests or play with the code.

Save it, then close the inline editor to back to the session type 'rerun' or just 'rr'

## Running your first test

The first test passed and printed a green line telling just that everything is ok. Now look around with 'log' (or 'l') again:

```

07 >> rr

Rerunning: `irb /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt`

Running: /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt
1. OK! object creation
person.irt >> irt#1(main)
01 >> l

Virtual Log Tail
person.irt
 2 bill = Person.new 'Bill', 'Gates'
 3
 4 desc "object creation"
 5 _yaml_eql? %(
 6   — !ruby/object:Person
 7   name: Bill
 8   surname: Gates
 9   )
10
11 irt

person.irt >> irt#1(main)
02 >> 
  
```

### Notice:

- If you want to see all the lines in the log and not just the tail, you should use 'log <n>' to print <n> lines of the tail, or 'full\_log' (or 'll') to print them all.
- The Log Tail now shows the executed lines from the file 'person\_obj.rb', and no lines from the session (indeed we didn't write anything interactively this time).
- Now we are in an interactive session opened by the 'irt' directive at the end of the file (line #11)

Let's add a few more tests for a couple of accessors:

```

02 >> bill.name
    => "Bill"
03 >> tt 'name'

desc "name"
_eq1?( "Bill" )

04 >>
05 >> bill.surname
    => "Gates"
06 >> tt 'surname'

desc "surname"
_eq1?( "Gates" )

07 >> l

Virtual Log Tail
person.irt
9 )
10
11 irt
    irt#1(main)
2  bill.name
3  desc "name"
3  _eq1?( "Bill" )
4
5  bill.surname
6  desc "surname"
6  _eq1?( "Gates" )

person.irt >> irt#1(main)
08 >> 

```

#### Notice:

We usually add an empty line after a test, so each test will look better separated from each other.

Now you can see the lines of the session. Just copy them with the method that has worked for you (as you did for the 'object creation' test), paste them into the file (leaving 'irt' at the end), save and 'rr'.



```

08 >> cvi

bill.name
desc "name"
_eq1?( "Bill" )

bill.surname
desc "surname"
_eq1?( "Gates" )

09 >> rr
The TEST is OK!

Rerunning: `irb /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt`

Running: /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt
1. OK! object creation
2. OK! name
3. OK! surname
person.irt >> irb#1(main)
01 >> 

```

We copied the lines with the 'cvi' command, pasted into vi, saved, and rerun the file. Cool! Now we have 3 test passed, and we can start to think how to break them :-).

So let's back coding. We have just realized that we need to add also a country field, so let's add it to our class:

```

class Person
  attr_accessor :name, :surname, :country
  def initialize(name, surname, country)
    @name = name
    @surname = surname
    @country = country
  end
end

```

You can use our preferred editor to edit the file, we do it in place by typing "vi 'person.rb'" in the console, edit the file, save it and close it (with :wq).

However you decided to change the file, that change is going to break our tests, so let's see what will happen and how easy will be fixing it. Type 'rr' in the console.

## Dealing with exceptions

```

01 >> vi 'person.rb'
02 >> rr
ALL 3 TESTs are OK!

Rerunning: `irb /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt`

Running: /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt
ArgumentError: wrong number of arguments (2 for 3)
    from /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt:2:in `initialize'
    from /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt:2:in `new'
    from /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt:2:
person.irt >> irt#1(main)
01 >> l

Virtual Log
person.irt
1 require 'person'
2 bill = Person.new 'Bill', 'Gates'

person.irt >> irt#1(main)
02 >> 

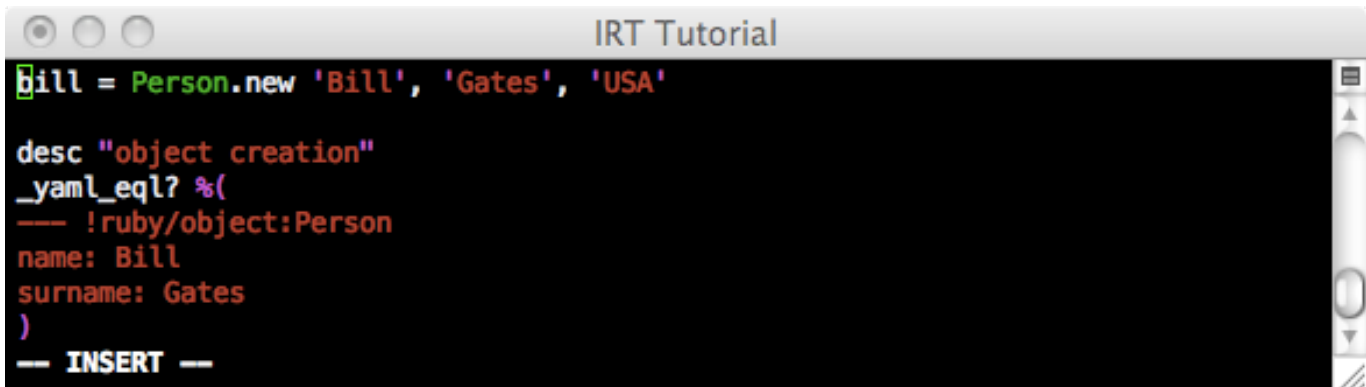
```

We got an error because the Person constructor now wants one more argument, and IRT just opened an interactive session at the line of the error: you can check it by looking at the log: it stops at line #2 of the file.

In a real world app you will probably have to check some value in the console in order to figure out what happened, but here we already know what went wrong, so we can skip that inspecting part.

You can open the file for in place editing at the line of the error by just typing 'nano' or 'vi' with no arguments, or if that is not installed, you can use 'edit' (or 'ed') or simply manually switch to your editor.

We will use 'vi' again, which will open the 'test/person.irt' file in insert mode at the line #2.



```

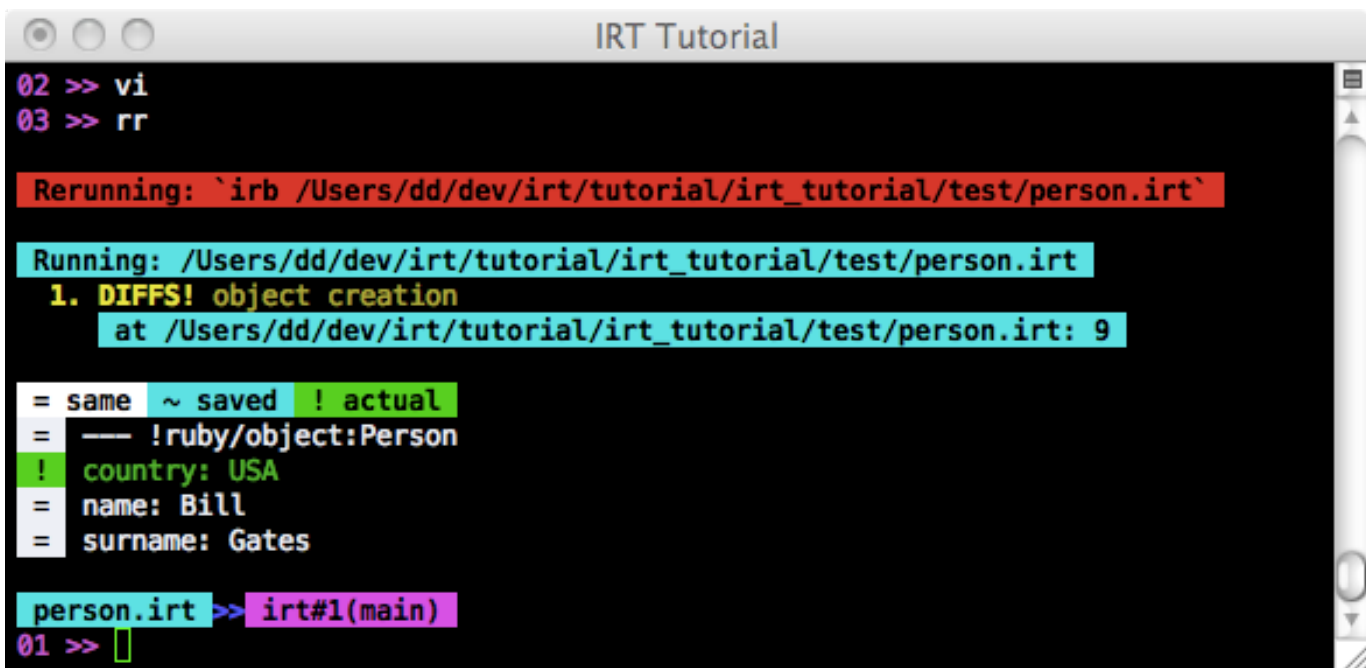
bill = Person.new 'Bill', 'Gates', 'USA'

desc "object creation"
_yaml_eq!?(
  --- !ruby/object:Person
  name: Bill
  surname: Gates
)
-- INSERT --

```

However you opened the file, just add 'USA' as the last parameter, save and 'rr'.

## Dealing with failures



```

02 >> vi
03 >> rr

Rerunning: `irb /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt`

Running: /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt
1. DIFFS! object creation
   at /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt: 9

= same ~ saved ! actual
= --- !ruby/object:Person
! country: USA
= name: Bill
= surname: Gates

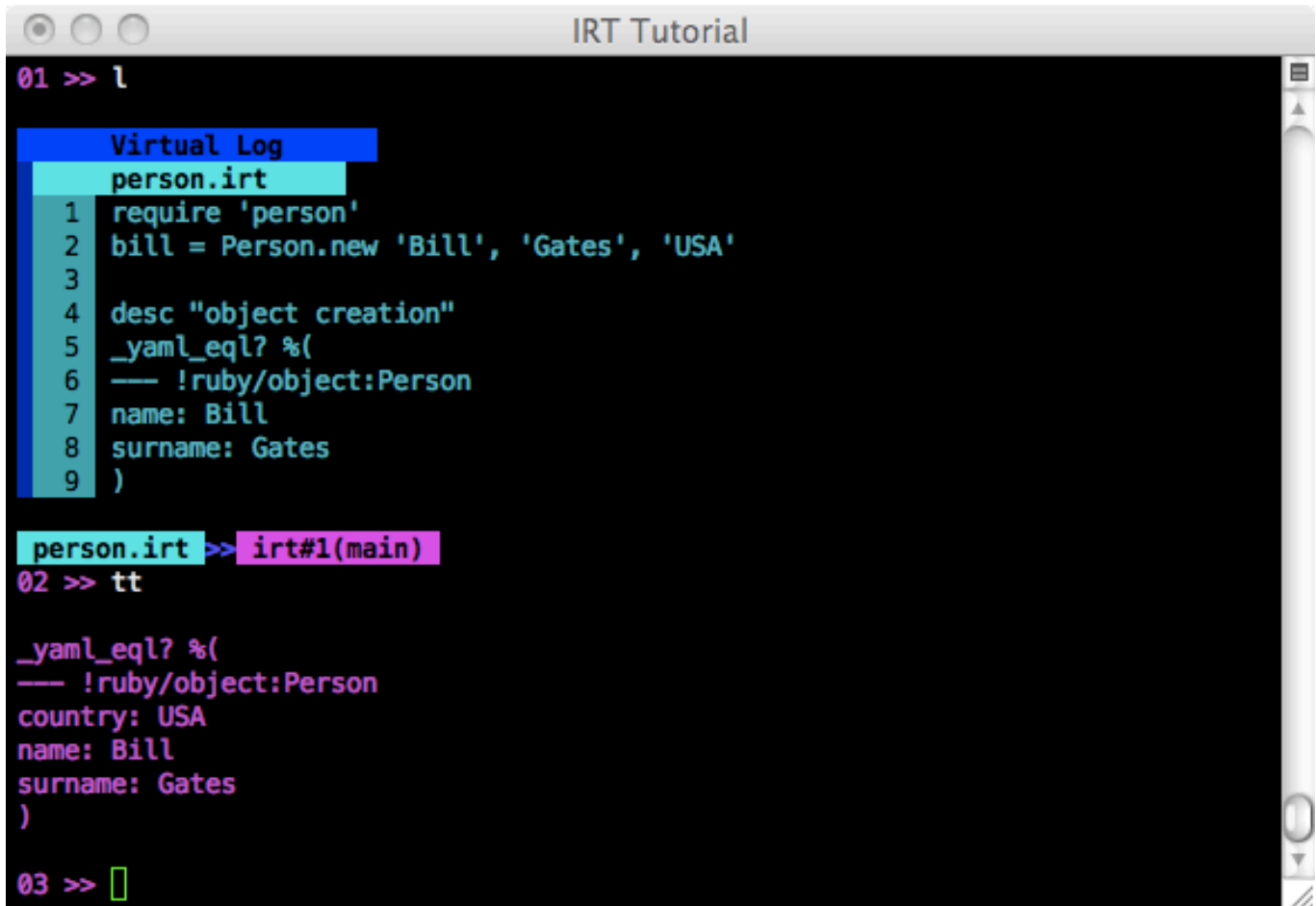
person.irt >> irt#1(main)
01 >> 

```

Well, now the error is gone, but the object has a different value from what we saved before, so the test failed and IRT opened an interactive session at the last eval'd line. Besides, IRT printed a nice diff report, that clearly highlight what is different between the saved and the actual value we got.

We can take a look the log again, just to remember what was the saved value (see the image below)

You might be tempted to manually add the missing value in the serialized string, after all it is very simple, but there is a safer way to do it (specially when you have more complex objects): just type 'tt' without any added description and you will get the test for the actual value we got now: you better substitute the old for the new.



```
IRT Tutorial
01 >> l

Virtual Log
person.irt
1 require 'person'
2 bill = Person.new 'Bill', 'Gates', 'USA'
3
4 desc "object creation"
5 _yaml_eql? %(
6 — !ruby/object:Person
7 name: Bill
8 surname: Gates
9 )

person.irt >> irt#1(main)
02 >> tt

_yaml_eql? %(
— !ruby/object:Person
country: USA
name: Bill
surname: Gates
)

03 >> 
```

You can do it with the copy-open command that best worked for you. We will do it with our preferred command 'cvi', paste and save, then go back to the session and type 'rr'.

```

03 >> cvi

_yaml_eq1? %(
  — !ruby/object:Person
  country: USA
  name: Bill
  surname: Gates
)

04 >> rr
1 TEST: 0 OKs, 1 DIFF, 0 ERRORS.

Rerunning: `irb /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt`

Running: /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt
1. OK! object creation
2. OK! name
3. OK! surname
person.irt >> irt#1(main)
01 >> 

```

Now everything is ok again.

### Note about in place edit

Notice: If you are not so used to use CLI text editors, please read the "Note about CLI text editors" in the README.

By looking at the examples till now, you might think that in place edit is not so useful after all. You could leave an editor window opened all the time with the file and just switch the windows back and forth.

Indeed in this context there is no real advantage, but in a real world application, you will soon have dozens of test files and you will probably run the full suite with just one command ('irt path/to/test/dir'), so when some exception is raised or some test fails, you would have to manually find the file among many others, open it and go to the right line.

With IRT you can do it with just one simple command: 'vi' or 'nn' and you will open the right file at the right line. Anyway, remember also that if you just want to look at what went wrong, you have always the 'log' (or 'l') command handy.

## Inspecting Sessions

Sometimes you might want just to play with a single object, for example when you want to learn how it works. You don't need to test anything, you are just playing, so you can open a session INTO the object. Our 'bill' object is a deadly simple object, so you don't have so much to learn, but just pretend it is a real complex object, and type:

```
>> irt bill
```

```

01 >> irt bill
person.irt >> irt#1(main) >> irt#2(bill)
01 >> self
=> #<Person:0x1017fcc20 @country="USA", @surname="Gates", @name="Bill">
02 >> name
=> "Bill"
03 >> @name
=> "Bill"
04 >> l

Virtual Log Tail
person.irt
11
12 bill.name
13 desc "name"
14 _eq1?( "Bill" )
15
16 bill.surname
17 desc "surname"
18 _eq1?( "Gates" )
19
20 irt

person.irt >> irt#1(main) >> irt#2(bill)
05 >> x
<< irt#2(bill)

person.irt >> irt#1(main)
02 >> 

```

### Notice:

- The status bar is now showing one more black/white colored label (and prompt)
- Indeed we are in the 'irt#2(bill)' inspecting session, launched from the 'irt#1'

(main)' interactive session, that was launched from the 'person.irt' file.

- In this session is that `self == bill`, so you have access to all the object bill variables and methods.
- In inspect mode the log does not record any step of the session and you cannot add descriptions or tests.
- You can exit from the session by just typing 'exit' or 'x' or 'q'.
- You will be notified by a printed label and the status bar reflecting the new status.
- At exit you will be again in the session you start from.

### Suggestion:

Opening an inspecting session is specially useful whenever you are in an interactive session preparing your tests, and you don't want to add anything to the log that is being recorded. An inspecting session is working in the isolating context of the inspected object.

## Binding sessions

Let's pretend again that our Person class is a really useful class, used from many other objects and classes in our application. Suppose we want to know more about the internal of our code, or about what's going on inside some method, in our case... suppose we want to know more about the constructor.

We can open a binding session at any line in any file executed by IRT by just adding the directive 'irt binding', so open your Person class and add that line in the method, then rerun the file:

```
class Person
  attr_accessor :name, :surname, :country
  def initialize(name, surname, country)
    @name = name
    irt binding
    @surname = surname
    @country = country
  end
end
```

```

02 >> vi 'person.rb'
03 >> rr
  ALL 3 TESTs are OK!

Rerunning: `irb /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt`

Running: /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt
person.irt >> irt#1(#<Person:0x1017fcb30>)
01 >> self
  => #<Person:0x1017fcb30 @name="Bill">
02 >> name
  => "Bill"
03 >> @name
  => "Bill"
04 >> self.name
  => "Bill"
05 >> surname
  => "Gates"
06 >> @surname
  => nil
07 >> self.surname
  => nil
08 >> y caller
-----
- ./person.rb:7:in `initialize'
- /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt:2:in `new'
- /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt:2:in `irb_binding'
- /opt/local/lib/ruby/1.8/irb/workspace.rb:52:in `irb_binding'
- /opt/local/lib/ruby/1.8/irb/workspace.rb:52
09 >> 

```

Notice:

- The status shows a yellow colored label and prompt, which represents the binding session.
- The self is the self at the binding line, so since we are in a constructor, self is an object of class Person.
- The @name has been set while the @surname (and @country) have not (it is after our irt call).
- You can see the callers from the method point of view.



```

09 >> l

Virtual Log
person.irt
1 require 'person'
2 bill = Person.new 'Bill', 'Gates', 'USA'

person.irt >> irt#1(#<Person:0x1017fcb30>)
10 >> tt
NotImplementedError: You cannot add a test in binding mode.
    from /opt/local/lib/ruby/gems/1.8/gems/irt-1.0.0.9dd8564/lib/irt/commands/test.rb:20:in `tt'
    from (irt#1):10:in `initialize'
    from ./person.rb:7:in `initialize'
    from /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt:2:in `new'
    from /Users/dd/dev/irt/tutorial/irt_tutorial/test/person.irt:2
11 >> vi
12 >> x
<< irt#1(#<Person:0x1017fcb30>)

1. OK! object creation
2. OK! name
3. OK! surname
person.irt >> irt#2(main)
01 >> 

```

### Notice:

- In binding mode the log does not record any step of the session
- The command usually available to an interactive session are not available (e.g. you cannot add descriptions or tests).
- In binding mode if you call 'vi', 'nano', 'nn' or 'edit' without any argument, IRT will open the file containing the 'irt binding' call with the cursor positioned right at that line (not for 'edit' though), so we can remove the 'irt binding' call from the 'person.rb' file right in the console.
- Type 'x' and the session will be closed, after that the file will continue to run till the 'irt' directive at the end...

## Comparing objects

IRT can compare complex objects and print a nice and easy to check graphical diff report of the yaml dump of the 2 objects.

Here we create 'other\_bill' Person object and compare it with 'bill'.

```

02 >> l
Virtual Log Tail
person.irt
11
12 bill.name
13 desc "name"
14 _eq?( "Bill" )
15
16 bill.surname
17 desc "surname"
18 _eq?( "Gates" )
19
20 irt

person.irt >> irt#l(main)
03 >> other_bill = Person.new 'Bill', 'Clinton', 'USA'
=> #<Person:0x10179a3e0 @country="USA", @surname="Clinton", @name="Bill">
04 >> vdiff bill, other_bill

= same a b
= --- !ruby/object:Person
=   country: USA
=   name: Bill
a  surname: Gates
b  surname: Clinton

05 >> []

```

## Checking the last value

When you invoke an IRT command, the last relevant value does not change (for example when you invoke 'vdiff' as you did before), besides the command is also ignored by the log.

You can check the last value by typing '\_' (the variable set by irb to the last value), or you can type 'p', 'pp', 'ap', or 'y' without any argument to inspect it with that method:

```

05 >> _
=> #<Person:0x10179a3e0 @country="USA", @surname="Clinton", @name="Bill">
06 >> p
#<Person:0x10179a3e0 @country="USA", @surname="Clinton", @name="Bill">
07 >> pp
#<Person:0x10179a3e0 @country="USA", @name="Bill", @surname="Clinton">
08 >> ap
#<Person:0x10179a3e0 @country="USA", @surname="Clinton", @name="Bill">
09 >> y
— !ruby/object:Person
country: USA
name: Bill
surname: Clinton
10 >> wanted_typo
NameError: undefined local variable or method `wanted_typo' for main:Object
      from /opt/local/lib/ruby/gems/1.8/gems/irt-1.0.0.9dd8564/lib/irt/init.rb
:20:in `method_missing'
      from (irt#1):10
11 >> l

Virtual Log Tail
person.irt
12 bill.name
13 desc "name"
14 _eq?( "Bill" )
15
16 bill.surname
17 desc "surname"
18 _eq?( "Gates" )
19
20 irt
irt#1(main)
3 other_bill = Person.new 'Bill', 'Clinton', 'USA'

person.irt >> irt#1(main)
12 >>

```

**Notice:**

- 'p', 'pp', 'ap' show the same output for a generic object Person. They offer different specialized formatting for different types of objects, so you can experiment with other types.
- The log ignores all the irt commands and all your typos, because they are not relevant for your code.

**Finalizing your suite**

The irt executable can run single files or multiple files in a dir, so you can reorganize the .irt files in sub dirs and run the files in one single dir or in all dirs.

You can also organize the file contents a little better if you extract all the common parts (like loading libraries and adding helpers methods) and stick in one or more 'irt\_helper.rb' files that will be loaded automatically when irt run (see the README "Note about IRT.autoload\_helper\_files").

Besides, you can extract reusable parts of your files (complete with code and tests) and use the "insert\_file 'path/to/partial/file'" and use that as they were part of other files. (see the README "File insert/eval")

Just remove any irt invocation from your .irt files. You will run all your test with just one command ('irt path/to/test/dir') without opening any interactive session. Anyway, if anything will go wrong in the future, IRT will open an interactive session at the failing line, so you will always get your interactivity back when you really need it.

**More...**

Type 'irt\_help' and experiment with the other features listed there. Read also the README file, which contains a lot of informations not mentioned here.

**Feedback, Support, Bugs Report, Requests, etc...**

Drop me a line at: dd.nexus at gmail.com. I usually answer in less than 24 hours.