

Eustathius, a program to generate texts from formal grammars

Stéphane Bortzmeyer
<stephane+blog@bortzmeyer.org>

Première rédaction de cet article le 26 Octobre 2006

<http://www.bortzmeyer.org/eustathius-test-grammars.html>

Eustathius is a set of programs to test ABNF grammars by parsing them and generating texts which obey the grammar.

You can use it to test ABNF in documents like the RFC or to test a parser that you have written.

Eustathius can be downloaded (en ligne sur <http://www.bortzmeyer.org/files/eustathius.tar.gz>). It will require an Haskell compiler to build.

You are free to use it, according to the GPL.

Here is a sample grammar (you can find many others, typically extracted from the RFCs in the `tests/` directory of the distribution) of a Lisp-like programming language :

```
program = expr
expr = spaces "(" spaces *(expr / term ) spaces ")" spaces
term = 1*ALPHA
spaces = *WSP
```

And here is the result of parsing with `abnf-parse`, a program of Eustathius :

```
% ./abnf-parse tests/minilisp.abnf
program : expr
expr : Seq[spaces ( spaces 0*10Choice[expr term] spaces ) spaces]
term : 1*10ALPHA
spaces : 0*10WSP
...
All the rules:
expr: (UNsafe)
term: (Safe)
...
```

(Safe are the rules for which there is at least a terminal in the next N steps.)

After that, you can use Eustathius to generate sample programs, for instance to give them to your parser :

```
% ./abnf-generate -s program tests/minilisp.abnf
( ( eWbejp ( ) ( kwMRMhvamEcGMLTDWGhTlooAXHQmzmwYiqEMn
) erDZ)LXfhB ( )ZtkatUF1SZ (yrKg (daaLeuAxXFGZq)
) (ObMi(y ) CoqZBW(qET ) ) )
```

Remember that the ABNF grammar (specified in RFC 5234) only describes the syntax. Some semantic rules are not, or cannot be expressed in the grammar and therefore, Eustathius can produce texts which are not legal. For instance, in RFC 3339, you find a grammar to generate dates and it does not protect against months ≥ 12 , so Eustathius can do :

```
% ./abnf-generate -s date tests/date.abnf
2679-73-08
```

Similar or useful programs :

- `abnngen` (<http://www.quut.com/abnngen/>) is very similar to Eustathius. Written in C, it has interesting options which Eustathius currently does not have.
- `bnfparser` (<http://bnfparser2.sourceforge.net/>) (untested by me).
- Other tools can be found at the [IETF tools page](http://tools.ietf.org/inventory/verif-tools) (<http://tools.ietf.org/inventory/verif-tools>).
- Another ABNF tool in Haskell, which I did not notice before writing Eustathius is included in `hsemial` (<http://cryp.to/hsemial/>).

Thanks to Kim-Minh Kaplan (<http://www.kim-minh.com/>) for his help and the discussions.