CoCoA-5 - Slug #862

append has bad complexity

05 Apr 2016 13:25 - John Abbott

Status:	New	**Start date:**	05 Apr 2016
Priority:	Normal	**Due date:**	
Assignee:		**% Done:**	0%
Category:	enhancing/improving	**Estimated time:**	0.00 hour
Target version:	CoCoA-5.?.?	**Spent time:**	0.60 hour

Description

The append function seems to have quite bad complexity.

```
N := 25000;
L := [];
t0 := CpuTime();
for i := 1 to N do
  append(ref L, i);
endfor;
println "Time to make list: ", TimeFrom(t0);
```

The above code takes about 1.2s on my computer; with N doubled, it takes about 5.3s; and with N multiplied by 4 it takes over 40s.

What is going on???

Related issues:

Related to CoCoA-5 - Slug #1228: SLUG: filling an array	**In Progress**	**30 Sep 2018**

History

#1 - 05 Apr 2016 13:27 - John Abbott

The C++ STL offers an operation (pushback) much like append which guarantees linear complexity for a loop like the one I tried in CoCoA.

A naive implementation would have quadratic complexity: each call to append makes a copy of the whole list.

How can CoCoA-5 have worse than quadratic complexity???

#2 - 05 Apr 2016 13:40 - John Abbott

Just out of curiosity I ran the example with N=20000; the time taken was about 210s... so still worse than quadratic behaviour, but not an increase by a factor of almost 8 as observed when increasing N from 50000 to 100000.

Mysterious! Time to do some (painful) profiling... :-/

#3 - 29 Apr 2019 15:49 - John Abbott

- Related to Slug #1228: SLUG: filling an array added