

Definite Clause Grammars

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Logic Programming and Constraints

"PROgrammation en LOGique"

The language was invented by Alain Colmerauer and baptized by Philippe Roussel in 1972 at University of Marseille, France

Robert Kowalski at Imperial College, London, UK had invented the Logic Programming equation:

LP = Logic + Control

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Definite Clause Grammar

Prolog was initially invented to support Definite Clause Grammars for natural language processing

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DCG of DCG

```
grammar_rule --> grammar_head, ['-->'], grammar_body.  
grammar_head --> non_terminal.
```

```
grammar_body --> grammar_body, [';'], grammar_body.  
grammar_body --> grammar_body, ['\n'], grammar_body.
```

```
grammar_body --> grammar_body_item.  
grammar_body_item --> ['!'].  
grammar_body_item --> ['{'], Prolog_goals, ['}'].  
grammar_body_item --> non_terminal. % any prolog term  
grammar_body_item --> terminal. % list of input
```

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Example DCG

```
word --> a, b.
```

```
a --> [].
```

```
a --> a, [a].
```

```
b --> [b].
```

```
:- phrase(word,  
  [a,a,a,b,b,b,b],  
  L).
```

```
% phrase/3 or phrase/2
```

```
a(L, L).
```

```
a(L1, L3) :-
```

```
  a(L1, L2),
```

```
  'C'(L2, a, L3).
```

```
b(L1, L2) :-
```

```
  'C'(L1, b, L2).
```

```
word(L1, L3) :-
```

```
  a(L1, L2),
```

```
  b(L2, L3).
```

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'C'

'C'([Token|Rest], Token, Rest).

It can be redefined to read other data than lists (for instance strings, streams, etc.)

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Example DCG

word(A) --> a(A), b.

a(0) --> [].

a(A) --> a(B), [a],
{A is B+1}.

b --> [b].

a(L, 0, L).

a(L1, A, L3) :-

a(L1, B, L2),

'C'(L2, a, L3), A is B + 1.

b(L1, L2) :-

'C'(L1, b, L2).

word(L1, A, L3) :-

a(L1, A, L2),

b(L2, L3).

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Adjective Forming Affixes in Indonesian

- Pe-
 - pemaarah, pendiam (add n before consonant other than m),
 - penidur (replace t by n)
- Se-
 - secantik, sesopan, sebesar
- Ber-
 - berbahaya
- Ter-
 - termurah, tercantik
- Ke-an
 - kebesaran, kekecilan
- MeN-kan
 - membosankan (n becomes m in front of b), memuaskan (n
 - disappears in front of m), menyenangkan (n disappears and ny
 - replaces s
- -an
 - bagus

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Root words

- Marah
- Diam
- Tidur
- Malas
- Cantik
- Sopan
- Mahal
- Bahaya
- Murah
- Baik
- Tinggi
- Besar
- Kecil
- Haus
- Puas
- Bosan
- Malu
- Senang
- Bagus
- Gede

Write a DCG for the affix formation of
adjectives in Indonesian with the
following root words

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