

## 1997 Paper 12 Question 7

### Compiler Construction

Describe an efficient tree pattern-matching algorithm that could be used to find a cheapest covering of an abstract syntax tree by pattern templates with given costs. Illustrate your algorithm using the following templates:

#1	$R \leftarrow k$	cost: 1
#2	$R \leftarrow f(R, k)$	cost: 2
#3	$R \leftarrow f(R, R)$	cost: 2
#4	$R \leftarrow f(R, f(R, k))$	cost: 3
#5	$R \leftarrow f(f(R, k), R)$	cost: 4

and the following tree:

$f(f(k, k), f(k, k))$

[20 marks]