1997 Paper 5 Question 6

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  <- k                  cost: 1

#2 R  <- f(R, k)            cost: 2

#3 R  <- f(R, R)            cost: 2

#4 R  <- f(R, f(R, k))      cost: 3

#5 R  <- f(f(R, k), R)      cost: 4
```

and the following tree:

```
f(f(k,k),f(k,k))
```

[20 marks]