

2003 Paper 4 Question 4

Comparative Programming Languages

Give a brief description of the main syntactic constructs used in Smalltalk (or Squeak) programs, illustrating your answer by explaining the meaning of the following fragment of code:

```
[self isAwake]
whileTrue:
[| item |
 item := self askForCookie.
 (self isCookie: item)
  ifTrue: [self eat: item]
  ifFalse: [self complainAbout:item].
 (self isFull) ifTrue: [self sleep]]
```

[10 marks]

Suggest how you implement in Smalltalk (or Squeak) a binary tree in which each node contains an integer and pointers to two or fewer other nodes of the same kind.

[4 marks]

Outline the code you would use (*a*) to construct this kind of tree, and (*b*) to sum all the integers in a given tree.

[6 marks]