

1994 Paper 10 Question 2

Modula-3

The following is a fragment of a Modula-3 program which is supplied with data arranged as one left-adjusted integer per line. The integers (which may be assumed to be all different) are read one at a time and the procedure `Put` assembles a simple binary tree by arranging for each integer in turn to be in a new node of the tree. The assembly process sorts the integers into numerical order.

```
VAR
  tree : PtrToNode := NIL;
BEGIN
  TRY
    LOOP
      TRY
        Put (Scan.Int (Rd.GetLine (Stdio.stdin)), tree)
      EXCEPT
        Scan.BadFormat =>
          Wr.PutText (Stdio.stdout, "Bad datum\n")
      END
    END
  END
EXCEPT
  Rd.EndOfFile =>
    END;
  PrintTree (tree);
  Wr.Close (Stdio.stdout)
```

Explain the operation of the two TRY-EXCEPT clauses. [5 marks]

Provide a suitable TYPE statement to define the type `PtrToNode`. [5 marks]

Write a procedure `Put` and explain its operation. [5 marks]

The procedure `PrintTree` is intended to write out the values in the tree in ascending order. Write this procedure and explain its operation. [5 marks]