1994 Paper 10 Question 1

Modula-3

What is an `UNSAFE` module in Modula-3?   [3 marks]

Compare and contrast the built-in Modula-3 procedures `VAL` and `LOOPHOLE`.
                                                                      [4 marks]

How is the following type `Bitset` likely to be implemented and why might this be useful?

```
TYPE
  Bitset = SET OF [0..31];
```
                                                                      [3 marks]

A procedure `Swap` is required which takes a 6-digit Hexadecimal `CARDINAL` value as its single argument. The procedure is intended to treat the digits as three adjacent pairs and reverse the order of each pair. The output from the following statement should be `214365`:

```
Wr.PutText (Stdio.stdout, Fmt.Int(Swap(16_123456),16) & "\n");
```

Write a complete test program which incorporates this statement and a procedure `Swap` which exploits type `Bitset` and the procedure `LOOPHOLE`. Explain how the procedure works.   [10 marks]