1998 Paper 2 Question 9

Software Engineering II

Consider the following code fragment, whose purpose is to form the product $m \times n$ in the integer variable x:

```
x := 0;  i := n;
while i<>0 do
    begin
    x := x+m;
    i := i-1
    end;
```

What is the loop invariant?   [3 marks]

Argue informally that the invariant holds at the appropriate points. Using the invariant, show that the loop is correct.   [5 marks]

Outline the main features of the Z specification language.   [9 marks]

To what extent can a formal specification language help a safety-critical system meet the requirement of being extremely reliable?   [3 marks]