

2005 Paper 10 Question 5

Comparative Programming Languages

Consider the Prolog procedures named `s` and `p` defined as follows:

```
s(H, [H|T], T).  
s(H, [N|T], [N|L]) :- s(H, T, L).  
  
p(X, [H|T]) :- s(H, X, Z), p(Z, T).  
p([], []).
```

- (a) Show how Prolog would evaluate the goal `s(H, [a,b,c], T)` giving all the successive instantiations of `H` and `T` that cause the goal to be satisfied, and hence describe in words what `s` does. [6 marks]
- (b) What value of `Q` causes the goal `p([a], Q)` to be satisfied? [3 marks]
- (c) What values of `Q` cause the goal `p([a,b], Q)` to be satisfied? [4 marks]
- (d) What values of `Q` cause the goal `p([a,b,c], Q)` to be satisfied? [5 marks]
- (e) Describe in words what `p` does. [2 marks]