

CIS 630 assignment #6

Due: Nov. 16 at class meeting.

Problem 1 (25') Say whether or not the following pairs of predicates are unifiable, and show the most general unifier for each unifiable pair. (Lower case letters are variables, and upper case letters are constants).

- 1. $p(x, B, B)$ and $p(A, y, z)$
- 2. $p(g(f(v)), g(u))$ and $p(x, x)$
- 3. $p(x, f(x))$ and $p(y, y)$
- 4. $p(y, y, B)$ and $p(z, x, z)$

Problem 2 (20') Explain why $p(f(x, x), A)$ does not unify with $p(f(y, f(y, A)), A)$.

Problem 3 (25') Sam, Clyde, and Oscar are elephants. We know the following facts about them:

- 1 Sam is pink,
2. Clyde is gray and likes Oscar,
3. Oscar is either pink or gray (but not both) and likes Sam.

Use the resolution refutation to prove that a gray elephant likes a pink elephant; that is, prove $(\exists x, y)[Gray(x) \cap pink(y) \cap Likes(x, y)]$.

Problem 3 (30') In the mail room example, we have the following knowledge base Δ .

- If pushable objects are blue, then non-pushable objects are green.
- All objects are either blue or green, but not both.
- If there is a non-pushable object, then all pushable objects are blue.
- Object O1 is pushable.
- Object O2 is not pushable.

1. Convert the statements into wffs in predicates calculus.
2. Convert all wffs into clause form.
3. Prove that there is a green object by resolution refutation.