

Stratified databases

Question 1 Consider the following database DB about policemen:

```

takes_bribes( $x$ )  $\leftarrow$  detective( $x$ ), not honest( $x$ )
honest( $x$ )  $\leftarrow$  policeman( $x$ ), not rich( $x$ )
policeman( $x$ )  $\leftarrow$  detective( $x$ )
policeman(Eric)
detective(Frank)
rich(Frank)

```

Eric and Frank are constants, and x is a variable.

- (a) Construct a supported minimal model for DB using iterated fixpoints ('ABW').
- (b) Check that your answer is (i) a model (ii) a minimal model and (iii) supported.

Question 2

- (a) Consider the following database DB1:

```

strong( $x$ )  $\leftarrow$  big( $x$ ), not weak( $x$ )
strong( $x$ )  $\leftarrow$  small( $x$ ), muscular( $x$ ), not weak( $x$ )
weak( $x$ )  $\leftarrow$  not muscular( $x$ )
small(Bill)
muscular(Bill)
big(Mary)

```

Bill and Mary are constants, and x is a variable.

- i) Construct the iterated fixpoint model for database DB1.
 - ii) Check that your answer is a model for DB1 and that it is supported.
- (b) Consider the following database DB2:

```

strong( $x$ )  $\leftarrow$  big( $x$ ), not weak( $x$ )
strong( $x$ )  $\leftarrow$  small( $x$ ), muscular( $x$ ), not weak( $x$ )
weak( $x$ )  $\leftarrow$  small( $x$ ), not strong( $x$ )
small(Bill)
muscular(Bill)
big(Mary)

```

Is Bill strong or weak according to the ABW semantics?

Question 3 Consider the following normal logic program P :

```

 $p \leftarrow r$ , not  $q$ 
 $q \leftarrow r$ , not  $s$ 
 $r$ 

```

Compute the ABW ('iterated fixpoint') model of P .

Now suppose you do not stratify but simply compute $T_P' \uparrow^\omega(\emptyset)$. Check you get something different. (If there is a common mistake in exams, this is it. The silly candidate forgets to stratify.)