

Name:

Course:

Instructor:

Date:

CS 724 Assignment Three: First-Order Logic and Prolog

1. Unifiable Predicates

- a) $P(B,A,B), P(x,y,z)$ – This is not unifiable because the predicates do not match
- b) $P(x,x), Q(A,A)$ – This is unifiable because the predicates are matching
- c) $\text{Older}(\text{Father}(y),y), \text{Older}(\text{Father}(x),\text{John})$. – This is unifiable because the predicates are arranged in an orderly manner
- d) $Q(G(y,z),G(z,y)), Q(G(x,x),G(A,B))$ – This is not unifiable because the predicates are not matching and are not arranged in a logical order
- e) $P(f(x), x, g(x)), P(f(y), A, z)$ – This predicate is not unifiable because it is not matching and most of them are not arranged in order

2. $\forall x \neg \text{pride}(x) \vee \text{smart}(x)$

$\text{pride}(\text{Tom})$

The above statements show that Tom is not kind because he has pride even though he is smart and can teach.

3. $\forall x,y T(x,y,x) \Rightarrow Q(x,y)$

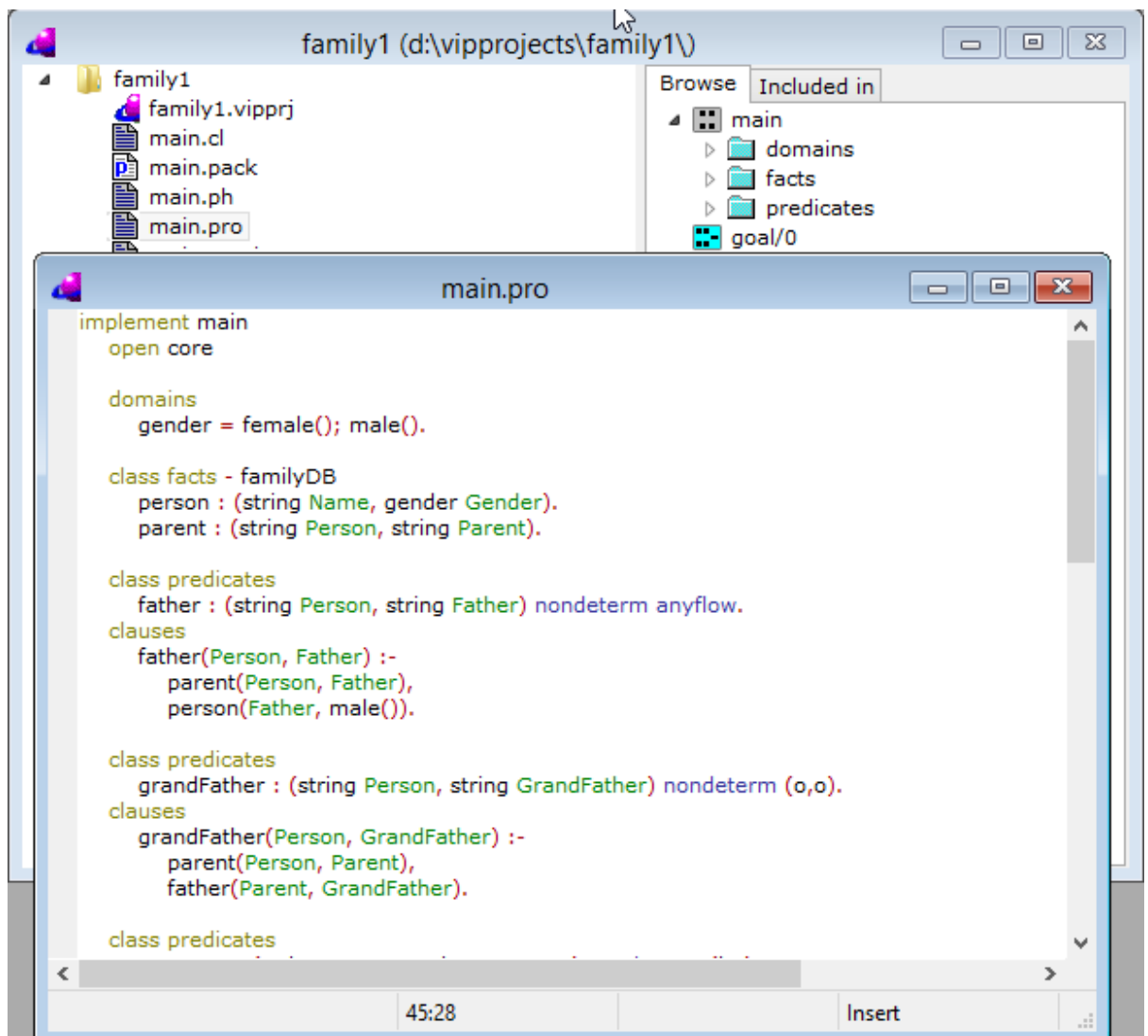
$\forall x,y S(x,y) \Rightarrow Q(y,x)$

$\forall x,y S(x,\text{Bob}) \wedge S(y,x) \Rightarrow P(x,y)$

$S(\text{Alice})$

$T(\text{Alice})$

4. SWI – Prolog



- a) $P(f(x), h(y)) \vee Q(y)$
 $\neg P(f(fx(w)), h(g(w)))$
- b) $\{ fx(g(u))/x, g(g(u))/y$
 $g(u)/w \}$
- c)
 - i) Andrew
 - ii) William, Harry, Peter, Zara, Beatrice and Eugenie
 - iii) George and Mum
 - iv) Anne and Sarah
 - v) Charles, Mark and Edward

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Translator.pro (Generation\CodesGeneration\Translator\)
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42:42  Insert      Indent
endPredicate : (string FileName) language apicall as "?GEN_endPredicate@Generatic
p6transX : () language apicall as "?GEN_Trans6X@Generation@Compiler@VIP@YG

clauses
toTarget(PredicateRE, FileName, StackFramePresent, LocalStaticSize) :-
    CodeSegment = objectFile::getPredicateCodeSegment(),
    CurrentSegment = objectFile::setCurrentSegment(CodeSegment),
    if true = compilerState::isDiagnosticNewFeature then
        beginPredicate_F(PredicateRE, LocalStaticSize, FileName, StackFramePresent)
        viOptimization(),
        viGeneration(),
        endPredicate_F(FileName)
    else
        beginPredicate(PredicateRE, LocalStaticSize, log::writeString, FileName, Stack
        p6transX(),
        endPredicate(FileName),
        virType::vi_ClearIndex()
    end if,
    _ = objectFile::setCurrentSegment(CurrentSegment).

% ---

class facts - p6trans_db
predicateRE : referredEntity := cReferredEntitiesManagement::absentRE_const.
lastLineNo : core::lineNumber := virType::absentLineNo.
currentPredEntryPC : objectFile::programCount := 0.
needsPredicateProfiling : boolean := bug,
localStaticSize : basicTypes::size := 0. % int ?
aux : unsigned := 0.
stackFramePresent : boolean := true.

```