

LSD Coursework 1: Question 8 (3rd February 2010)

Q8) Consider the following Progol input file:

```
% Parameter Settings
```

```
:- set(i,2), set(c,3), set(inflate,1000)?
```

```
% Mode Declarations
```

```
:- modeh(1,qsort([+int | +ilist],-ilist))?
```

```
:- modeb(1,qsort(+ilist,-ilist))?
```

```
:- modeb(1,part(+int,+ilist,-ilist,-ilist))?
```

```
:- modeb(1,append(+ilist,[+int | +ilist],-ilist))?
```

```
% Type Information (standard definition of integer lists)
```

```
ilist([]).
```

```
ilist([Head|Tail]) :- int(Head), ilist(Tail).
```

```
% Background Knowledge (standard definitions of partition and append)
```

```
part(X,[],[],[]).
```

```
part(X,[X|Tail],List1,List2) :- part(X,Tail,List1,List2).
```

```
part(X,[Head|Tail],[Head|Tail1],List2) :- Head < X, part(X,Tail,Tail1,List2).
```

```
part(X,[Head|Tail],List1,[Head|Tail2]) :- Head > X, part(X,Tail,List1,Tail2).
```

```
append([],List,List).
```

```
append([Head|Tail],List1,[Head|List2]) :- append(Tail,List1,List2).
```

```
% Positive examples
```

```
qsort([],[]).
```

```
qsort([1],[1]).
```

a) Download and read the Progol manual from the course website at <http://www.cs.bris.ac.uk/Teaching/Resources/COMSM0301/tutorial4.4.ps>

b) Briefly describe the meaning of the settings shown above

c) Does the first example `qsort([],[])` conform to the head declaration?

d) Give the Bottom Set that Progol would compute using the second positive example `qsort([1],[1])` as the seed example (bearing in mind that Progol treats all positive examples as true during its computations).