RYERSON UNIVERSITY
MTH 714 LAB#12 - SOLUTIONS

	1.	$P(x,z) \leftarrow Q(x,y), P(y,z)$	program clause
	2.	$P(u,u)$	program clause
	3	$Q(a,b)$	program clause
1.	4	$\leftarrow P(v,b)$	goal
	5.	$\leftarrow Q(v,y), P(y,b)$	1,4
	6.	$\leftarrow P(b,b)$	3,5 $\{v \leftarrow a, y \leftarrow b\}$
	7.	$\square$	2,6 $\{u \leftarrow b\}$

	1.	$p(a,b)$	program clause
	2.	$p(c,b)$	program clause
	3.	$p(x,y) \leftarrow p(x,z), p(z,y)$	program clause
	4.	$p(x,y) \leftarrow p(y,x)$	program clause
2.	5.	$\leftarrow p(a,c)$	goal
	6.	$\leftarrow p(a,z), p(z,c)$	3,5 $\{x \leftarrow a, y \leftarrow c\}$
	7.	$\leftarrow p(b,c)$	1,6 $\{z \rightarrow b\}$
	8.	$\leftarrow p(c,b)$	4,7 $\{x \leftarrow b, y \leftarrow c\}$
	9.	$\square$	2,8

Therefore, the goal is indeed a logical consequence of the program.

[Harder exercise: Try to show that, if we delete any program clause, the goal is no longer a logical consequence of the remaining program clauses. In other words, there are no redundant clauses in the program.]

3. By analyzing the SLD-tree for this goal clause under the given program, we see that there are infinitely many successful computations, which consist of the branches of the form

$$(2) \rightarrow (2) \rightarrow \ldots \rightarrow (2) \rightarrow (1)$$

i.e. all those computations which consist of the repeated use of the second program clause terminating by use of the first clause.

On the other hand, there is one infinite computation branch, in which we always use the second line of the program.