Solution — Homework 1

Question 1:

1. $T_1 = \pi_{model}(\sigma_{speed \geq 133}(PC)) \cup \pi_{model}(\sigma_{speed \geq 133}(Laptop))$ — this gives us the list of computers whose speed is at least 133.
2. $T_2 = \pi_{maker,model}(Product \triangleright\!\!\triangleleft T_1)$ — this gives us the list of makers and computer models where (i) the model is produced by the maker; and (ii) the model's speed is at least 133.
3. $T_3 = \pi_{maker}(\sigma_{maker=maker1 \wedge model \neq model1}(T_2 \times T_2[maker1, model1]))$ — gives us the list of makers who produce at least two computers with speed at least 133

Question 2:

1. $T_1 = \pi_{model,speed}(PC) \cup \pi_{model,speed}(Laptop)$ — this gives us the list of computers with their corresponding speed.
2. $T_2 = \pi_{model}(\sigma_{speed < speed1}(T_1 \times T_1[model1, speed1]))$ — this gives us the models which are slower than some other models
3. $T_3 = \pi_{model}(T_1) - T_2$ — this gives us the fastest models
4. $T_4 = \pi_{maker}(Product \triangleright\!\!\triangleleft T_3)$ — the list of all makers who produce at least one fastest machine