Order of Queries: a -> TRC, b -> DRC, c -> QBE

1. Part names that Adams provides
   1. {P.pname | P in Parts and (exists S in Suppliers, R in SP)(  
       S.s# = R.s# and P.p# = R.p# and S.sname = ‘Adams’  
      )}
   2. {N | (exists S, P)(  
       Suppliers(S, ‘Adams’,\_,\_) and Parts(P, N,\_,\_,\_) and SP(S, P,\_)  
      )}
   3. | SUPPLIERS | PARTS | SP |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | S# | SNAME | STATUS | CITY | P# | PNAME | COLOR | WEIGHT | CITY | S# | P# | QTY |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | \_S | ADAMS | | | \_P | P. | | | | \_S | \_P | |
2. Supplier names that supply P2
   1. {S.sname | S in Suppliers and (exists R in SP)(  
       S.s# = R.s# and R.p# = ‘P2’  
      )}
   2. {N | (exists S)(  
       Suppliers(S, N,\_,\_) and SP(S, ‘P2’,\_)  
      )}
   3. | SUPPLIERS | PARTS | SP |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | S# | SNAME | STATUS | CITY | P# | PNAME | COLOR | WEIGHT | CITY | S# | P# | QTY |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | \_S | P. | | | | | | | | \_S | P2 | |
3. Supplier names and total quantity of parts supplied
   1. {S.sname, sum(qty) | S in Suppliers and R in SP and S.s# = R.s#}
   2. {N, sum(QTY) | (exists S, P)(  
       Suppliers(S, N,\_,\_) and SP(S, P, QTY)  
      )}
4. Supplier names who supply parts with quantity less than 300
   1. {S.sname | S in Suppliers and (exists R in SP)(  
       S.s# = R.s# and R.qty < 300  
      )}
   2. {N | (exists S, QTY)(  
       Suppliers(S, N,\_,\_) and SP(S,\_, QTY) and QTY < 300  
      )}
   3. | SUPPLIERS | PARTS | SP |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-------+  
      | S# | SNAME | STATUS | CITY | P# | PNAME | COLOR | WEIGHT | CITY | S# | P# | QTY |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-------+  
      | \_S | P. | | | | | | | | \_S | | < 300 |
5. Supplier names that supply Blue or Green parts
   1. {S.sname | S in Suppliers and (exists P in Parts, R in SP)(  
       S.s# = R.s# and P.p# = R.p# and P.color = ‘Blue’ or P.color = ‘Green’  
      )}
   2. {N | (exists S, P)(  
       Suppliers(S, N,\_,\_) and Parts(P,\_, C,\_,\_) and SP(S, P,\_) and  
       C = ‘Blue’ or C = ‘Green’  
      )}
   3. | SUPPLIERS | PARTS | SP |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | S# | SNAME | STATUS | CITY | P# | PNAME | COLOR | WEIGHT | CITY | S# | P# | QTY |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | \_S | P. | | | \_P | | \_C | | | \_S | \_P | |  
        
      Extra Constraints: \_C = ‘Blue’ or \_C = ‘Green’
6. Supplier names and parts name pairs they don’t supply
   1. {S.sname | S in Suppliers and (forall P in Parts)(  
       not (exists R in SP) (S.s# = R.s# and P.p# = R.p#)  
      )}
   2. {SN, PN | (exists S)(  
       Suppliers(S, SN,\_,\_) and (forall P)(  
       Parts(P, PN,\_,\_,\_) and not SP(S, P,\_)  
      ))}
7. Supplier names for suppliers without any parts
   1. {S.sname | S in Suppliers and not (exists R in SP) (S.s# = R.s#)}
   2. {N | (exists S) (Suppliers(S, N,\_,\_) and not (SP(S,\_,\_))}
   3. | SUPPLIERS | PARTS | ⌐ SP |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | S# | SNAME | STATUS | CITY | P# | PNAME | COLOR | WEIGHT | CITY | S# | P# | QTY |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | \_S | P. | | | | | | | | \_S | | |
8. Supplier names that supply all parts
   1. {S.sname | S in Suppliers and (forall P in Parts) (exists R in SP)(  
       S.s# = R.s# and P.p# = R.p#  
      ))}
   2. {N | (exists S) (Suppliers(S, N,\_,\_) and (forall P)(  
       Parts(P,\_,\_,\_,\_) and SP(S, P,\_)  
      ))}
   3. | SUPPLIERS | ⌐ PARTS | ⌐ SP |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | S# | SNAME | STATUS | CITY | P# | PNAME | COLOR | WEIGHT | CITY | S# | P# | QTY |  
      +----+-------+--------+------+----+-------+-------+--------+------+----+----+-----+  
      | \_S | P. | | | \_P | | | | | \_S | \_P | |
9. Supplier names who supply all parts except P1
   1. {S.sname | S in Suppliers and (forall P in Parts)(  
       P.p# = ‘P1’ and not (exists R in SP) (S.s# = R.s# and P.p# = R.p#)  
      ) or (  
       P.p# != ‘P1’ and (exists R in SP) (S.s# = R.s# and P.p# = R.p#)  
      )}
   2. {N | (exists S) (Suppliers(S, N,\_,\_) and (forall P)(exists PN)(  
       Parts(P, PN,\_,\_,\_) and PN = ‘P1’ and not SP(S, P,\_)  
       ) or (  
       PN != ‘P1’ and SP(S, P,\_)  
      ))}
10. Supplier names, number of parts and total quantity supplied
    1. {S.sname, count(R.p#), sum(qty) |  
        S in Suppliers and R in SP and S.s# = R.s#  
       }
    2. {N, count(\*), sum(QTY) | (exists S)(  
        Suppliers(S, N,\_,\_) and SP(S,\_, QTY)  
       )}
11. Supplier names that supply all parts that Jones does
    1. {S’.sname | S’ in Suppliers and (forall P in Parts) (exists R in SP)(  
        S’.s# = R.s# and P.p# = R.p#) or not (exists S in Suppliers, R in SP)(  
        S.sname = ‘Jones’ and S’.s# = R.s# and P.p# = R.p#)  
       }
    2. {N | (exists S’, S) (Suppliers(S’, N,\_,\_) and Suppliers(S, ‘Jones’,\_,\_)  
        and N != ‘Jones’ and (forall P)  
        (Parts(P,\_,\_,\_,\_) and SP(S, P,\_) and SP(S’, C,\_) or not SP(S, C,\_)))  
       }  
         
       Result: Smith, Blake
12. Supplier names that supply only parts that Jones does
    1. {S’.sname | S’ in Suppliers and (exists S in Suppliers)   
       (S.sname = ‘Jones’ and (forall P in Parts)(  
        not (exists R in SP) (S.s# = R.s# and P.p# = R.p#) and   
        not (exists R’ in SP) (R’.p# = R.p# and R’.s# = R.s#)  
       ) or (  
        exists R in SP) (S.s# = R.s# and P.p# = R.p# and (  
        exists R’ in SP) (S’.s# = R’.s# and R’.p# = R.p#)  
       ))}
    2. {N | (exists S’, S) (Suppliers (S’, N,\_,\_) and (  
        Suppliers(S, ‘Jones’,\_,\_) and N != ‘Jones’ and (forall P)(  
        Parts(P,\_,\_,\_,\_) and (SP(S, P,\_) and SP(S’, P,\_) or not  
        SP(S, P,\_) and not SP(S’, P,\_))))  
       )}  
         
       Result: Blake