

Given a set of rules and facts, you have to reason whether a statement is true or false. Here are some facts and rules:

- F1: $r1(\text{lorenz}, \text{emma})$.
- F2: $r1(\text{lorenz}, \text{marie})$.
- F3: $r1(\text{lorenz}, \text{adrian})$.
- F4: $r1(\text{lorenz}, \text{elena})$.
- F5: $r1(\text{isabella}, \text{emma})$.
- F6: $r1(\text{isabella}, \text{marie})$.
- F7: $r1(\text{isabella}, \text{adrian})$.
- F8: $r1(\text{isabella}, \text{elena})$.
- F9: $r1(\text{leo}, \text{mia})$.
- F10: $r1(\text{leo}, \text{philipp})$.
- F11: $r1(\text{mia}, \text{lana})$.
- F12: $r1(\text{laura}, \text{selina})$.
- F13: $r1(\text{selina}, \text{paula})$.
- F14: $r1(\text{valentin}, \text{paula})$.
- F15: $r1(\text{dominik}, \text{lana})$.
- F16: $r1(\text{emma}, \text{gertrude})$.
- F17: $r1(\text{emma}, \text{lukas})$.
- F18: $r1(\text{marie}, \text{luisa})$.
- F19: $r1(\text{marie}, \text{florian})$.
- F20: $r1(\text{marie}, \text{claudia})$.
- F21: $r1(\text{elias}, \text{gertrude})$.
- F22: $r1(\text{elias}, \text{lukas})$.
- F23: $r1(\text{helga}, \text{elias})$.
- F24: $r1(\text{jakob}, \text{elias})$.
- F25: $r1(\text{adrian}, \text{selina})$.
- F26: $r1(\text{christian}, \text{luisa})$.
- F27: $r1(\text{christian}, \text{florian})$.
- F28: $r1(\text{christian}, \text{claudia})$.
- F29: $r1(\text{florian}, \text{jonas})$.
- F30: $r1(\text{ella}, \text{jonas})$.
- F31: $r1(\text{claudia}, \text{mia})$.
- F32: $r1(\text{claudia}, \text{philipp})$.
- F33: $r43(\text{lorenz})$.

F34: $r44(\text{isabella})$.

F35: $r44(\text{marie})$.

F36: $r43(\text{adrian})$.

F37: $r43(\text{christian})$.

F38: $r43(\text{florian})$.

F39: $r44(\text{ella})$.

F40: $r43(\text{jonas})$.

F41: $r44(\text{elena})$.

F42: $r44(\text{claudia})$.

F43: $r43(\text{leo})$.

F44: $r44(\text{mia})$.

F45: $r44(\text{laura})$.

F46: $r44(\text{selina})$.

F47: $r44(\text{luisa})$.

F48: $r43(\text{valentin})$.

F49: $r44(\text{paula})$.

F50: $r43(\text{dominik})$.

F51: $r44(\text{lena})$.

F52: $r44(\text{emma})$.

F53: $r43(\text{philipp})$.

F54: $r43(\text{elias})$.

F55: $r44(\text{gertrude})$.

F56: $r44(\text{helga})$.

F57: $r43(\text{jakob})$.

F58: $r43(\text{lukas})$.

L1: $\forall A, B, C : r1(B, A) \wedge r1(B, C) \wedge r44(A) \rightarrow r2(A, C)$

L2: $\forall A, B, C : r1(B, A) \wedge r1(B, C) \wedge r43(A) \rightarrow r3(A, C)$

L3: $\forall A, B : r1(A, B) \wedge r44(A) \rightarrow r4(A, B)$

L4: $\forall A, B : r1(A, B) \wedge r43(A) \rightarrow r5(A, B)$

L5: $\forall A, B, C : r1(A, B) \wedge r1(B, C) \wedge r44(A) \rightarrow r6(A, C)$

L6: $\forall A, B, C : r1(A, B) \wedge r1(B, C) \wedge r43(A) \rightarrow r7(A, C)$

L7: $\forall A, B, C, D : r1(A, B) \wedge r1(B, C) \wedge r1(C, D) \wedge r44(A) \rightarrow r8(A, D)$

L8: $\forall A, B, C, D : r1(A, B) \wedge r1(B, C) \wedge r1(C, D) \wedge r43(A) \rightarrow r9(A, D)$

L9: $\forall A, B, C, D : r1(B, A) \wedge r1(B, C) \wedge r1(C, D) \wedge r44(A) \rightarrow r10(A, D)$

L10: $\forall A, B, C, D : r1(B, A) \wedge r1(B, C) \wedge r1(C, D) \wedge r43(A) \rightarrow r11(A, D)$

- L11: $\forall A, B, C, D, E : r1(B, A) \wedge r1(B, C) \wedge r1(C, D) \wedge r1(D, E) \wedge r44(A) \rightarrow r12(A, E)$
- L12: $\forall A, B, C, D, E : r1(B, A) \wedge r1(B, C) \wedge r1(C, D) \wedge r1(D, E) \wedge r43(A) \rightarrow r13(A, E)$
- L13: $\forall A, B, C, D, E, F : r1(B, A) \wedge r1(C, B) \wedge r1(C, D) \wedge r1(D, E) \wedge r1(E, F) \wedge r44(A) \rightarrow r14(A, F)$
- L14: $\forall A, B, C, D, E, F : r1(B, A) \wedge r1(C, B) \wedge r1(C, D) \wedge r1(D, E) \wedge r1(E, F) \wedge r43(A) \rightarrow r15(A, F)$
- L15: $\forall A, B, C, D, E : r1(B, A) \wedge r1(C, B) \wedge r1(C, D) \wedge r1(D, E) \wedge r44(A) \rightarrow r16(A, E)$
- L16: $\forall A, B, C, D, E : r1(B, A) \wedge r1(C, B) \wedge r1(C, D) \wedge r1(D, E) \wedge r43(A) \rightarrow r17(A, E)$
- L17: $\forall A, B, C, D, E, F, G : r1(B, A) \wedge r1(C, B) \wedge r1(D, C) \wedge r1(D, E) \wedge r1(E, F) \wedge r1(F, G) \wedge r44(A) \rightarrow r18(A, G)$
- L18: $\forall A, B, C, D, E, F, G : r1(B, A) \wedge r1(C, B) \wedge r1(D, C) \wedge r1(D, E) \wedge r1(E, F) \wedge r1(F, G) \wedge r43(A) \rightarrow r19(A, G)$
- L19: $\forall A, B, C, D, E, F : r1(B, A) \wedge r1(C, B) \wedge r1(D, C) \wedge r1(D, E) \wedge r1(E, F) \wedge r44(A) \rightarrow r20(A, F)$
- L20: $\forall A, B, C, D, E, F : r1(B, A) \wedge r1(C, B) \wedge r1(D, C) \wedge r1(D, E) \wedge r1(E, F) \wedge r43(A) \rightarrow r21(A, F)$
- L21: $\forall A, B : r1(B, A) \wedge r44(A) \rightarrow r22(A, B)$
- L22: $\forall A, B : r1(B, A) \wedge r43(A) \rightarrow r23(A, B)$
- L23: $\forall A, B, C : r1(B, A) \wedge r1(C, B) \wedge r44(A) \rightarrow r24(A, C)$
- L24: $\forall A, B, C : r1(B, A) \wedge r1(C, B) \wedge r43(A) \rightarrow r25(A, C)$
- L25: $\forall A, B, C, D : r1(B, A) \wedge r1(C, B) \wedge r1(D, C) \wedge r44(A) \rightarrow r26(A, D)$
- L26: $\forall A, B, C, D : r1(B, A) \wedge r1(C, B) \wedge r1(D, C) \wedge r43(A) \rightarrow r27(A, D)$
- L27: $\forall A, B, C, D : r1(B, A) \wedge r1(C, B) \wedge r1(C, D) \wedge r44(A) \rightarrow r28(A, D)$
- L28: $\forall A, B, C, D : r1(B, A) \wedge r1(C, B) \wedge r1(C, D) \wedge r43(A) \rightarrow r29(A, D)$

Does it imply that the statement “ $r16(\text{gertrude}, \text{adrian})$ ” is True? If the statement is True, please answer with “True”. Otherwise, please answer with “False”.