After identifying the predicate argument form of the following arguments test their validity using the tree method.

1. There is a philosopher who studies all philosophers. Therefore, there is a philosopher who studies himself.
2. All Trojans fear Achilles. Hector is Trojan. Therefore, Hector fears Achilles.
3. Everybody loves Achilles, but Achilles loves nobody but Patroclus. Therefore, Achilles is Patroclus.
4. Lysander loves everybody who loves Helena. Helena loves herself. Therefore, Lysander loves himself.
5. Only secretaries and administrators are eligible for the Clean Desk Prize. Ian is eligible for the Clean Desk Prize. Therefore Ian is a secretary and an administrator.
6. There is a man in town who shaves all men in town who do not shave themselves. Therefore there is a man in town who shaves himself.
7. There is nothing made of tin that is not cheap. No swords are made of lead. Not everything is either tin or lead. Therefore not all swords are cheap.

Check the validity of the following argument forms using the tree method. If an argument is invalid, provide a counter-model.

1. \((\forall x)(Fx \supset Gx)\); \((\exists x) \sim Fx\) therefore \((\forall x)(Gx \lor \sim Fx)\)
2. \((\exists x) Fx & (\exists x) Gx\); therefore \((\exists x)(Fx & Gx)\)
3. \((\forall x)(\exists y)(Fx \supset (Gxy \lor Gxx))\); therefore \((\forall x)(\exists y)(Fx \supset Gxy)\)
4. \((\exists x)((Fx \lor Gx) & Hx)\); \(\sim(\exists x)(Hx \supset Fx)\); therefore \((\forall x)(Hx \lor Fx)\)
5. \((\exists x)(Fx & Gx); (\exists x)(Fx & Hx); therefore \((\exists x)(Fx & (Gx & Hx))\)
6. \((\forall x)(Fx \supset Gx)\); \((\exists x) \sim Gx\) therefore \((\exists x) \sim Fx\)
7. \((\forall x)(Fx \supset Gx)\) therefore \((\forall x)Fx \supset (\forall x)Gx\)
8. \((\forall x)(Fx \lor Gx)\) therefore \((\forall x)Fx \lor (\exists x)Gx\)
9. \((\forall x)((Fx & Gx) \supset Hx)\) therefore \((\forall x)(Fx \supset (\sim Gx \lor Hx))\)