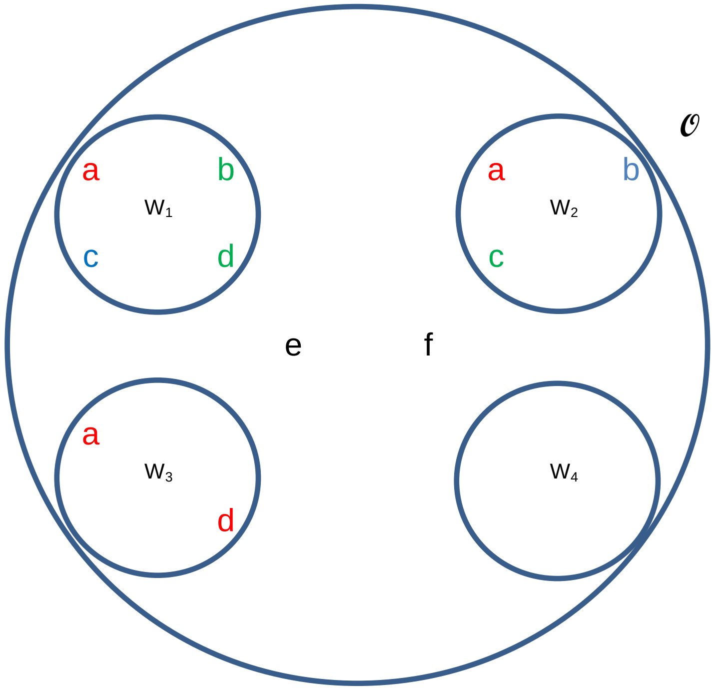
Philosophy 160
Evaluating formulas in Meinongian free logic



$\mathcal{V}(R,w_1) = \{a, e\}$
$\mathcal{V}(G,w_1) = \{b, d\}$
$\mathcal{V}(B,w_1) = \{c\}$
$\mathcal{V}(R,w_2) = \{a\}$
$\mathcal{V}(G,w_2) = \{c, f\}$
$\mathcal{V}(B,w_2) = \{b, d, e\}$
$\mathcal{V}(R,w_3) = \{a, d, e\}$
$\mathcal{V}(G,w_3) = \{b\}$
$\mathcal{V}(B,w_3) = \{\ \}$
$\mathcal{V}(R,w_4) = \{a\}$
$\mathcal{V}(G,w_4) = \{b, c, f\}$
$\mathcal{V}(B,w_4) = \{d,e\}$

The model $\mathcal{V}$ above depicts a universe of four possible worlds $\mathcal{W}_{\mathcal{V}} = \{w_1, w_2, w_3, w_4\}$ belonging to an outer domain $\mathcal{O}$. For objects in the domain of some world (a, b, c and d) the colors of the name letters indicate the properties of the objects in those worlds: Red, Blue or Green. To determine the colors of objects in $\mathcal{O}$ that do not belong to <u>any</u> world (e, f) or that do not belong to the world under evaluation, refer to the fully specified predicate valuations on the right.

Directions: Evaluate the following as true or false in $\mathcal{V}$.

1. The only objects that exist in w_1 are a, b, c and d**.** **True**

2. e is red in w_1. **True**
This statement does not imply that e <u>exists</u> in w_1 , only that it is red. The valuation on the right says that e is red in w_1.

3. d is blue in w_4. **False**

4. No objects exist in w_4. **True**

5. f is green in w_1 and w_4. **False**

6. $\mathcal{V}(\exists xRx, w_4)$ = **False**

7. $\mathcal{V}(Ra, w_4)$ = **True**
Even though <u>nothing</u> <u>exists</u> in w_4, the valuation on the right tells you a is red at w_4.

8. $\mathcal{V}(\exists x\ a{=}x, w_4)$ = **False**

9. $\mathcal{V}(\exists xGx, w_3)$ = **False**

10. $\mathcal{V}(Gf \rightarrow \exists xGx, w_4)$ = **False**
Since Gf is true at w_4, but $\exists xGx$ is false since nothing exists at w_4.

11. $\mathcal{V}({\sim}\exists x\ c{=}x \rightarrow \forall yRy, w_4)$ = **True**
${\sim}\exists x\ c{=}x$ is logically equivalent to $\forall x{\sim}c{=}x$. Which is true only if everything in the world is not identical to c. In other words, if something is in this world, then it is identical to c. But since there is nothing in w_4, the antecedent condition is always false, therefore ${\sim}\exists x\ c{=}x$ is true. For the same reasons the consequent is true as well. Hence, this statement is true.
Note:This points out an important fact in free logic. In empty worlds, all universally quantified expressions are true.

12. $\mathcal{V}(\forall xGx, w_4)$ = **True**
See rationale in 11.

13. $\mathcal{V}(\Diamond Ra, w_4)$ = **True**

14. $\mathcal{V}(\Box Ra, w_1)$ = **True**
Ra is true in every world, including w_4 .

15. $\mathcal{V}(\Box\exists xRx, w_4)$ = **False**
$\exists xRx$ is false in at least one world, namey w_4

16. $\mathcal{V}(\Diamond Ge, w_2)$ = **False.**
There is no world in which e is green.

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17. $\mathcal{V}(\Box\exists x\ x{=}x, w_3)$ = **False**
It is not necessarily the case that something exists since nothing exists at w_4.

18. $\mathcal{V}(\sim(Be \rightarrow Bd), w_4)$ = **True**
This is logically equivalent to (Be & ~Bd). Since Be and Bd are both true at w_4 this proposition is false.

19. $\mathcal{V}(Gb \rightarrow \exists xGx, w_3)$ = **False**
Gb is true at w_3 but ∃xGx is false since no existing thing is G at w_3.

20. $\mathcal{V}(\Diamond\forall xRx \rightarrow (\sim Ra \rightarrow Gb)), w_4)$ = **True**
Antecedent is true by virtue of w_3 and consequent is true by virtue of falsity of ~Ra at w_4.

21. $\mathcal{V}(\Diamond(\forall xRx \rightarrow (\sim Gb \ \&\ Re))), w_4)$ = **True**
For this proposition to be true, the conditional needs to be true in some world. It is true in every world in which ∀xRx is false.

22. $\mathcal{V}(\Diamond\sim\exists x\ x{=}x \rightarrow \forall y(Ry \vee Gy \vee By)), w_4)$ = **True**
The antecedent condition is true if there is at least one possible world in which ∀x ~x=x. For the reasons provided in 11 above, this is true in w_4. (This is suprising, since it a contradiction, but it does no harm, since it is true of no object in w.) For the same reason, the consequent is true. Hence, the entire conditional is true.

23. For every w in $\mathcal{V}$ there is a name letter *a* and a predicate *P*, such that *Pa* is true in w, and $\mathcal{V}(a,w) \notin \mathfrak{D}w$. **True**
This says that in every world there is a true statement of the form *Pa* concerning an object that does not exist in that world.