Levitron: Combining Ground and Lifted Planning

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In this work, we describe the *Levitron* planner.[1] Levitron is essentially a wrapper around a lifted and a ground planner. It combines the lifted planner *Powerlifted* (Corrêa et al. 2023a) with the ground planner *Scorpion Maidu* (Corrêa et al. 2023b). Both are sequential portfolio planners but they have complementary strengths: Scorpion Maidu is efficient in tasks of moderate size; Powerlifted works well on larger tasks that are challenging to ground.

Levitron uses Scorpion Maidu as a default component, and Powerlifted as a fallback when the translator of Scorpion Maidu fails. It participated in the satisficing and the agile tracks, and Scorpion Maidu's translator is given a different time limit depending on the track. For the satisficing track, this limit is 15 minutes. For the agile track, the limit is 3 minutes. If the translator reaches the time limit or surpasses the memory limit (of 8 GiB for both tracks), Levitron aborts Scorpion Maidu and calls Powerlifted. If the translator finishes correctly, Powerlifted is never used.

We do not describe the details of Scorpion Maidu and Powerlifted here, and we refer to their planner abstracts for a complete description (Corrêa et al. 2023a; 2023b).

References

Corrêa, A. B.; Francès, G.; Hecher, M.; Longo, D. M.; and Seipp, J. 2023a. The Powerlifted Planning System in the IPC 2023. In *Tenth International Planning Competition (IPC-10): Planner Abstracts*.

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[1]A Levitron is a toy that demonstrates the principles of magnetic levitation, in which a spinning top is *lifted* and suspended above a magnetic base. The spinning top contains a magnet with its north pole facing outward, while the magnetic base has a north pole facing upward. The repelling forces between these two north poles generate the lift required for the top to levitate.