

Automated Planning



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F29AI*

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Domain

The underwater exploration is portrayed in the seaExp_ domain by a variety of objects, such as locations, personnels, buildings, kits, submarines, and monsters. Predicates are used to indicate the following: object position, monsters' invasion of a location, personnel on submarines, personnel's control over kits, object usage, connectivity between locations, and building development status. The modeling of the interactions and scenarios in the domain is based on these predicates.

Actions in the domain include building structures out of kits, fighting monsters, loading, and unloading kits from submarines, and moving submarines between locations. To provide a realistic and logical progression within the undersea exploration, the actions are carefully developed regarding preconditions and effects. For instance, the personnel must have the required equipment, the submarine must be at the correct location before construction can begin, and the building's construction status is updated according to the action.


The inclusion of monsters and battle actions enhances the domain even more. The 'conq' predicate, which represents conquering monsters, introduces a strategic planning component by forcing personnel to interact with monsters at designated areas. This domain offers a flexible framework to investigate various scenarios related to undersea exploration.


Problem 1 :


Our submarine's mission in this challenging scenario is to navigate from shallow water to deep water. The submarine, a construction kit, a pilot, and an engineer are in shallow water in the initial configuration. The goal is to successfully transition to a different depth level by moving the submarine and the construction kit into deep water.

Keeping the submarine and the kit moving in accordance with the domain's regulations is a challenging task. The safe transfer of the submarine is the responsibility of the pilot and engineer. The solution to this challenge needs to be a plan that makes efficient use of the 'load,' move,' and 'unload' operations. In order to accomplish the intended outcome, the planner must maneuver the submarine to the nearby deep-water location while coordinating the actions of personnel and the construction kit.

The planner must strategize for the engineer and pilot to successfully load a kit onto a submarine, move it to a deep-water location, and unload it, considering interdependencies, synchronization, and resource efficiency, and exploring various solutions.

 `move submarine pilot cmd_cntr deep_water`

 `load submarine pilot cont_kit cmd_cntr`

 `unload submarine pilot cont_kit deep_water`

Problem 2 :

In this problem scenario, our submarine is equipped with a structural kit and assigned with building a tidal generator in shallow water. The initial setup includes the submarine, structural kit, engineer, and command center, all located in the command center area. The goal is to build a tidal generator, denoted by the predicate “built”, in an adjacent shallow water location.

To achieve this goal, the engineer must successfully load the structural kit onto the submarine, navigate the submarine to a shallow water location, and perform a "build" action to build a tidal generator plant. The challenge here lies in the correct coordination of actions, ensuring that the kit is used in the right place and that the construction is carried out successfully. The plan must take into account adjacency requirements, stating that construction can only take place in specific areas adjacent to the command center.

The planner must evaluate efficient routes and optimal construction times for a submarine, ensuring proper synchronization between loading, movement, and construction. Intelligent decision-making and understanding of domain constraints are crucial for crafting a successful plan.

```
move submarine engineer cmd_cntr shallow_water
```

```
load submarine engineer str_kit cmd_cntr
```

```
construct submarine engineer str_kit tidal_gen shallow_water
```

Problem 3 :

In this problem scenario, The submarine encounters a challenge. The initial setup includes a submarine, shield set, pilot, kraken, and command center, spread across shallow and deep water locations. The goal is to fight the Kraken, research the location and bring the submarine to the command center.

To achieve these goals, the pilot must navigate the submarine to the kraken's location, ensuring that the shield set is used in battle. In addition, the submarine had to study the vortex, that is, collect valuable information. Finally, the submarine must safely return to the command center after completing its mission, avoiding potential threats and obstacles in the underwater environment.

This issue poses a general challenge, requiring strategic planning and precise action. The plan must combine combat actions, utilization of kits, movement between different water depths and achievement of multiple objectives. The success of this scenario depends on the planner's ability to arrange these various actions coherently and in the correct order.

```
move submarine pilot shallow_water deep_water
```

```
battle submarine pilot kraken shield deep_water deep_water
```

```
move submarine pilot deep_water cmd_cntr
```

Problem 4 :

In this problem scenario, The submarine is driven by the pilot and scientist uses the scanner to scan deep-water. The initial setup includes a submarine, scanner , pilot, and command center, spread across the command center and deep-water locations. The goal is to scan the deep water location.

To achieve these goals, the pilot must navigate the submarine to the deep water location, ensuring that the scanner to scan the location. In addition, the submarine had to study the deep water, that is, collect valuable information.

This problem emphasizes a general challenge, requiring strategic planning. The plan must combine analyze actions, utilization of scanner, movement between different water depths and achievement of multiple objectives. The success of this scenario depends on the planner's ability to arrange these various actions coherently and in the correct order.

```
move submarine pilot cmd_cntr deep_water
```

```
analyze submarine scientist scientist deep_water deep_water
```