Report of Automated Planning

The layout of the submarine:

Bridge (door) combat information center (door) science lab (door) sickbay (door) launch bay.

Design decisions:

The action of the submarine is move, set off, return to base, hyperspace jump. The submarine can move from one region to another region directly. The reason why I decided to separate move to base from move is I found the planning include go back to base from time to time, after separated, reduced this situation to some extent. When the planner achieved some goals, it always returns to base that in order to achieve submarine at base goal, and I tried to put mission goals into precondition of action of return to base, but due that different problems have different mission goals, this seems that will produce many duplicated code. In this question, the lecture helped me a lot, his assumption is right that the planner use return to base in middle just wants to achieve deploy mini-sub action. After deleting deployed action from the return to base action and goals, the planner only uses return to base at the end of the plan.

The action of the crew is go into, order, get in mini-sub, get off mini-sub and healing. The crew can only go into cabin that has a door connected. When a crew get in or get off the mini-sub, the mini-sub must be docked at the submarine. All crew must go to launch bay to get in or get off mini-sub.

The action of mini-sub is to detach, return to the submarine, get mineral samples. When mini-sub detached it isn’t docked, and when mini-sub returned it is docked. Mini-sub and submarine must stay in the same region to finish docking. Engineers must stay at launch bay to control mini-sub drill mineral.

There are kinds of missions, install sensors, check bases, study mineral samples, study vortex. Engineers must stay in mini-sub to install sensors. Captain will injure if he checks a base captured by enemy and security personnel isn’t in combat information center, but in those cases, security personnel never leave his position. Science officers must go to launch bay to pick up samples and back to science lab to study. Science officer can stay in lab to study vortex but the submarine must in the region where has a vortex.

Additional feature:

According to intelligence, Atlanteans built two outposts in abyssal plains and deployed one submarine in one of the outpost, and we knew the position of HQ of Atlanteans which located on a shore. In this mission, our submarine has to destroy all bases and submarine with torpedo and ballistic missile. However, enemy put many naval mines where include the range of the ballistic missile. We cannot directly move into the region with naval mine, but there is a vortex that may help us. To be noticed, once the HQ is destroyed, all naval mines are disabled.

Solution:

All of the problem I used editor.planning.domains planner to solve. The problem1 is the easiest and problem 4 is the hardest, and problem5 as DLC.

Problem1: two bases need to check and two vortexes need to study. Vortex1 and base2 are located in abyssal plain1, vortex2 located in ridge3, base1 located in abyssal plain3. Base1 captured by Atlanteans, base2 doesn’t.

Solution: the plan is very good.

Problem2: copper sample needs to study, two sensors need to install, one base needs to check. Ridge3 contains copper mineral, sensor1 need to install in abyssal plain1, sensor2 need to install in abyssal plain2. Base1 is located in abyssal plain3.

Solution: the plan is perfect, but the submarine detaches drilling mini-sub to do nothing and call it back.

Problem3: one vortex needs to study, three sensors need to install, thorium sample needs to study. Vortex1 located in ridge2, sensor1 need to install in abyssal plain1, sensor2 need to install in abyssal plain2, sensor3 need to install in abyssal plain4. Ridge2 contains thorium mineral.

Solution: the plan is excellent without any strange action.

Problem4: one vortex needs to study, three mineral samples need to study, three sensors need to install, one base needs to check. Vortex1 located in ridge2, uranium, thorium, and sulfur sample located in ridge1, base1 located in abyssal plain3, sensor1 need to install in abyssal plain1, sensor2 need to install in abyssal plain2, sensor3 need to install in abyssal plain4.

Solution: the plan is marvellous.

Problem5: base1, base2, base3, Atlantean’s submarine need to be destroyed. Base1 is located in abyssal plain1, base2 located in abyssal plain2, enemy submarine located in base2, base3 located on a shore. Missile needs to launch from abyssal plain3 and abyssal plain4, but ridge1, ridge2, abyssal plain3, and abyssal plain4 have naval mine. Vortex1 is located in empty1.

Solution: the plan is exactly as same as what I wanted to be.

All in all, I found that it is very important to delete useless objects and constant in problem file, or the planner will crash if the goal is complex.