

# SAT: Software Quality and Code Style

Improve the code quality of the following programs:

1.

```
1 class Laboratory {
2
3     Microscope microscope;
4
5     Result analyze(Sample sample) {
6         if (microscope.isInorganic(sample) == true) {
7             return Result.INORGANIC;
8         } else {
9             return analyzeOrganic(sample);
10        }
11    }
12
13    private Result analyzeOrganic(Sample sample) {
14        if (microscope.isHumanoid(sample) == false) {
15            return Result.ALIEN;
16        } else {
17            return Result.HUMANOID;
18        }
19    }
20 }
```

2.

```
1 class Astronaut {
2
3     String name;
4     int missions;
5
6     boolean isValid() {
7         if (missions < 0 || name == null || name.trim().isEmpty()) {
8             return false;
9         } else {
10            return true;
11        }
12    }
13 }
```

3.

```
1 class Spaceship {
2
3     Crew crew;
4     FuelTank fuelTank;
5     Hull hull;
6     Navigator navigator;
7     OxygenTank oxygenTank;
8
9     boolean willCrewSurvive() {
10         return hull.holes == 0 &&
11             fuelTank.fuel >= navigator.requiredFuelToEarth() &&
12             oxygenTank.lastsFor(crew.size) > navigator.timeToEarth();
13     }
14 }
```

4.

```
1 class Logbook {
2
3     void writeMessage(String message, Path location) throws IOException {
4         if (Files.isDirectory(location)) {
5             throw new IllegalArgumentException("The path is invalid!");
6         }
7         if (message.trim().equals("") || message == null) {
8             throw new IllegalArgumentException("The message is invalid!");
9         }
10        String entry = LocalDate.now() + ": " + message;
11        Files.write(location, Collections.singletonList(entry),
12                    StandardCharsets.UTF_8, StandardOpenOption.CREATE,
13                    StandardOpenOption.APPEND);
14    }
15 }
```