CSC364/CSCM64 Lab 2

To be solved in groups of two or three.
Last day for lab sign-off: ~~7th March~~ 14th March 2022

Task 1.
Consider the following specification of a computational problem:

Altered Product.

- **Input:** Two integers x, y.
- **Output:**
  - `Out of Range` if any of the inequalities $1 \leq x \leq 10$ or $2 \leq y \leq 12$ is violated.
  - $x \cdot y - 2$ otherwise.

Tasks.

1. Give a test suite for Boundary Value Analysis for the problem Altered Product.
2. Briefly describe how your test suite would change when applying Robustness Testing, Worst Case Testing, or Robust Worst Case Testing. How many test cases do you get with each respective testing method?
3. Which of the four variations of Boundary Value Testing do you think is most suitable for this problem? Give a brief justification of your answer.

Task 2.
Consider the following specification of a computational problem:

Line Configuration Classification.

- **Input:** Six integers a, b, c, u, v, w
- **Output:**
  - `Out of Range`, if at least one of the six inputs lies outside the interval $[0, 100]$.

- `Invalid Input`, if $a = b = 0$ or $u = v = 0$.
- `Equal`, if the input is neither "out of range" nor "invalid" and if the straight line L_1 defined by the equation $ax + by = c$ is equal to the straight line L_2 defined by the equation $ux + vy = w$.
- `Parallel`, if the input is neither "out of range" nor "invalid" and if the straight line L_1 defined by the equation $ax + by = c$ is parallel but not equal to the straight line L_2 defined by the equation $ux + vy = w$.
- `Intersecting` in all other cases.

Tasks

1. Give a test suite for Boundary Value Analysis for the problem Line Configuration Classification. You are allowed to use symmetry properties of the problem to reduce the number of test cases.
2. Discuss the quality of your test suite. Is it likely to detect common faults that are present in a software solution to the problem? Is it likely to detect most faults? Does it provide good coverage?
3. Briefly discuss the benefits and drawbacks of Robustness Testing, Worst Case Testing, and Robust Worst Case Testing for this problem. Do they yield better test suites than Boundary Value Analysis? Which of the four variants of Boundary Value Testing is best suited for generating a test suite for this problem?

Task 3.

Consider the following specification of a computational problem:

Mortgage.

- **Input:**
  - An integer `age`.
  - An integer `salary`.
  - A enumerated value `gender` $\in$ {`male`, `female`}.
- **Output:**
  - `Out of Range`, if `age` does not fall within the closed interval $[18, 55]$ or `salary` does not fall within the closed interval $[1, 10000]$.

– Otherwise, an integer `salary` · `factor`, where `factor` is computed according to the following table:

Category	`factor`
Young (18 – 35 years)	75 for `male`, 70 for `female`
Middle (36 – 45 years)	55 for `male`, 50 for `female`
Old (46 – 55 years)	30 for `male`, 35 for `female`

Tasks

1. Define partitions of the input domain for the Mortgage problem.
2. Give a minimal test suite for Weak Normal Equivalence Class testing.
3. Give a minimal test suite for Strong Normal Equivalence Class testing (you are allowed to reuse values from your previous test suite).
4. Which of these two testing methods is better suited for the problem? Provide a short justification for your answer.