

FALL 2023

Case Study: The ACME RUN product

GENERAL INFORMATION

This document describes the “term-specific” part of your assignment. For details about logistics and delivery, please refer to the assignment description (and associated material) available on Avenue.

It is **intentionally brief, intentionally slightly ambiguous**, and is meant to allow you to try some of the techniques and methods you’ve learned in the course. What matters most in doing the assignment is your explanation and justification, not whether you produce “the right answer”. As with most software engineering problems, there is more than one good answer. We seek **well-justified answers** that, at the very least, correctly apply the methods, techniques and paradigms covered in lectures.

If clarifications are needed on the business domain, feel free to ask your question in the `#customer` channel on MS Teams. This document is provided for pedagogical purposes and, as such, is freely inspired by real-life products and tools (i.e., [Zombies, Run!](#) [1]). The objective is to confront students with real-life-like systems, even if this is “just” a one-term assignment.

CONTEXT

You are working for ACME (*A Company that Makes Everything*), as part of their IT department. You have been contacted by a client named *HammerCorp Inc.* to design and develop a new game they want to launch in Fall 2024 on the North American market. The code name of this project is **ACME RUN**.

PRODUCT DESCRIPTION: ACME RUN

The targeted market is people wanting to stay healthy. As gym subscriptions are expensive when including access to personalized training programs, there is space in the fitness industry for a new mobile application allowing people to access personalized workouts safely and playfully.

In a nutshell, the product is a gamified running application. Players register in a given geographical zone, where “trails” are available for running. These trails were curated with local authorities to ensure runners’ safety (e.g., the Brantford and Lakeshore trails in Hamilton). When they go for a running session, they start the app on their cellphone and their compatible *Heart Rate Monitor* (HRM) if they own one.

When running, they will be attacked by virtual enemies (e.g., grumpy profs on campus, enraged beavers in Cootes). Based on their profile, the game will offer several options to the player so that they can stay alive:

- **Sheltering:** Some safe zones are available on the trails that the player can use to get some rest. These zones can be benches in parks or partnering shops. Sheltering is always an option, except if the player activates the “hardcore” mode.
- **Escaping:** To escape the attacker, they must run faster for a period of time that the app will determine based on the user’s previous run and statistics (interval training, [2]).
- **Fighting back:** The player can face their enemies by attacking them. The game will give them a short set of body-weight physical exercises (e.g., push-ups, jumping jacks) to execute as their “fight back” effort.

When the system offers multiple options, players can decide what to do and tell it to the app (e.g., tap on the screen, vocal response). The app remembers the player's decisions and adapts their training plan (offering to escape or fight back) to provide the best fitness experience.

If the players connect an HRM to the app, it will collect information on heart rate to adapt the workout to the physical response of the player. For example, if the player's objective is to work on their cardio, the game will trigger events (escape or fights) that will help maintain the player's heart rate in the cardio zone (> 70% of max heart rate). The maximum heart rate is initially measured as $220 - \text{age}$, but will eventually be adapted with other information (e.g., weight) and how the players respond to the workout [3].

Players can access their profiles and win badges based on global challenges that run in the app. For example, "HalloweeK" will happen the week preceding Halloween and reward players who have fought back more than escaped enemies. To ensure players stay active during traditionally quiet periods (e.g., summer months), challenges like *Marathon Rush* (run a cumulated distance of 26.2 miles in a month) will be organized.

As the app is geo-fenced, it aims to be locally operated by partners. For example, as McMaster was selected as a pilot partner, MacRun will be the pilot app deployed on McMaster's campus and surrounding areas (a corridor between the bayfront on the lake and the Dundas Valley Conservation Area). If the pilot project succeeds, it'll be deployed in other cities in north America. Local operations include the definition of the trails to ensure player safety, as well as administrating the shelters' location.

REFERENCES

1. Zombies, Run! https://en.wikipedia.org/wiki/Zombies_Run!
2. Laursen, Paul B., and David G. Jenkins. "The scientific basis for high-intensity interval training." *Sports medicine* 32.1 (2002): 53-73.
3. Aubert, André E., Bert Seps, and Frank Beckers. "Heart rate variability in athletes." *Sports medicine* 33 (2003): 889-919.

