



GAMIFICATION OF APPROPRIATION: INCREASING THE CURIOSITY FOR TINKERING

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THE CHALLENGES OF DISCOVERING NOVEL CREATIVE IT USES

Technologies increase human capabilities and quality of life best if its users are able to appropriate technologies to multiple purposes. This is however rare, due to three reasons:

1. Serendipitous discoveries are very rare: appropriation does not usually happen through fortuitous accident, but requires a perceived need.
2. Discovery based on a perceived need requires technological expertise and/or programming skills about the surrounding IT resources, which most users do not possess.
3. Purposeful but playful exploration of technological resources (e.g., by tinkering and hacking) does not interest all people.

Because of these reasons, the traditional end-user programming is unlikely to become widespread.

MAKING EXPLORATION OF IT EXCITING

We believe that the challenges listed above can be overcome:

1. If users spend voluntarily more time with the technology, thus increasing the potential for serendipitous discoveries.
2. If they find it more exciting to learn technology-related skills and knowledge
3. If also tinkering is more exciting.

But overcoming the challenges is possible!

Consider the maker/DIY community, programmers' flow experiences, and the excitement of playing with Legos. In these cases, it is inherently satisfying to appropriate the resources at hand and invent entirely new projects or new improvements to old works.

→ **How could the same experiences be part of IT use?**

GAMIFICATION OF END-USER PROGRAMMING

Gamification of IT appropriation can be a solution for helping more people find new uses for IT.

We are exploring this opportunity by developing end-user programmable Internet of Things system for homes [1]. By extending the trigger-action programming paradigm that IFTTT web service has made popular [2], we provide users with a toolkit, consisting of sensors, actuators, and a mobile-friendly web-based end-user programming environment.

Users can start their appropriations from simple yet useful "recipes" which they then can chain together. The figure below provides an example. Through careful interaction design, we also try to instigate a sense of "intriguing incompleteness": feeling that by adding just one more feature to the rules, they become even better.

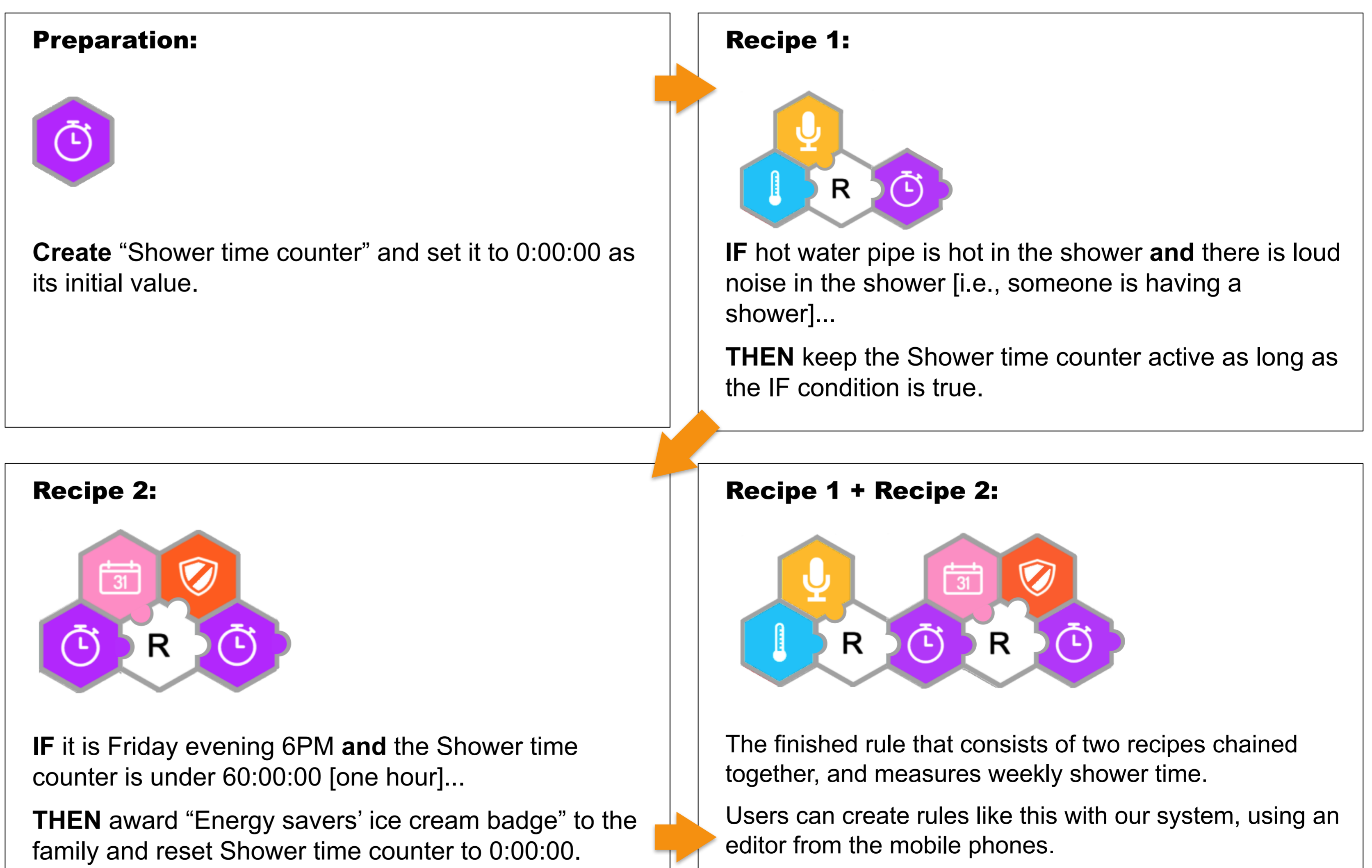
TACKLING THE CHALLENGES

By making programming fun, and creating a sense of intriguing incompleteness, we aim to tackle the three challenges. We encourage the users to design new rules just for the sake of its inherent enjoyment, which creates more opportunities for serendipitous discoveries.

In user studies during summer 2017, we hope to show that the excitement of exploration will increase perseverance and motivates users to continue interacting with the system and identify new interesting challenges. Finally, the experiences of success in turn increase self-efficacy and expertise.

We hope to show that this way even those not usually interested in programming will find the system interesting, will remain as active users, and learn to think of IT as material that can be adapted to one's personal needs.

HOW EASY IS IT TO PROGRAM A SYSTEM THAT HELPS YOU SAVE ENERGY BY MEASURING THE WEEKLY TIME SPENT IN A SHOWER?



Gamified creation of home automation rules. Complex rules can be created by chaining two recipes together by using time counters (as pictured) or with point counters.

[1] Bellucci, Vianello, Florack Jacucci. 2016. Supporting the Serendipitous Use of Domestic Technologies. *IEEE Pervasive Computing* 15, 2 (2016), 16–25.

[2] Ur, McManus, Pak Yong Ho, Littman. 2014. Practical Trigger-Action Programming in the Smart Home. CHI 2014.