

Learning Computer Science by Watching Video Games

Hiroyuki Nagataki Okayama University, Japan nagataki@cc.okayama-u.ac.jp

Approach – Using video games as learning materials of CS

- Video games – good concrete examples for learning CS and Informatics
 - Easy to grasp the mechanism of computational behavior by visual and auditory effects
 - Closely linked with the history of evolution of computers
 - A lot of real sources – a variety of interesting examples can be found
 - ‘Classic’ or ‘bad’ games are preferable for observing computational behavior
- Enhance learners’ interests and learning motivation for CS
 - Easy to lead learners aware that every behavior of computers around them has some reason based on CS theory and technology

Binary expressions

Level	16
Max HP	255
Gold	65535

Online battles with up to **256!**

Maximum values are often $2^x(-1)$

Overflow

‘1-up glitch’



Code Theory

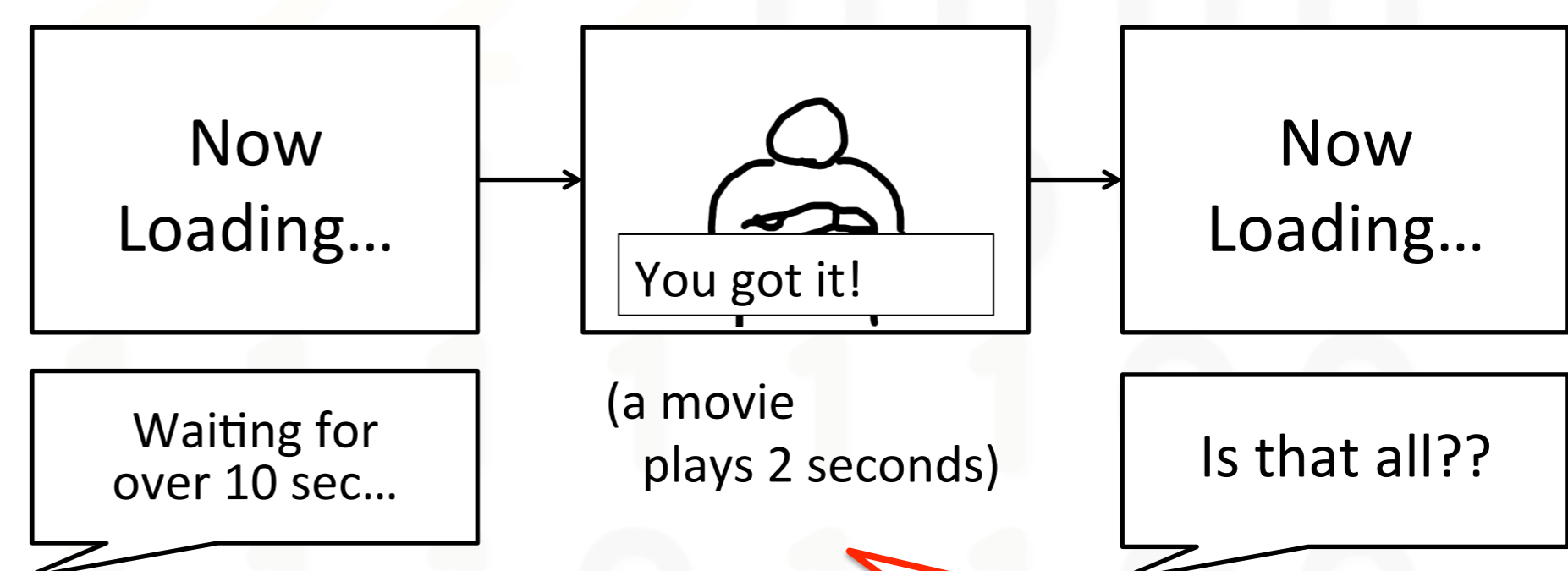
Data lost

We’re very sorry but the record of Number 1 has been lost...

How did they detect ‘data loss’?

Primary & secondary storage

‘Now loading’ process

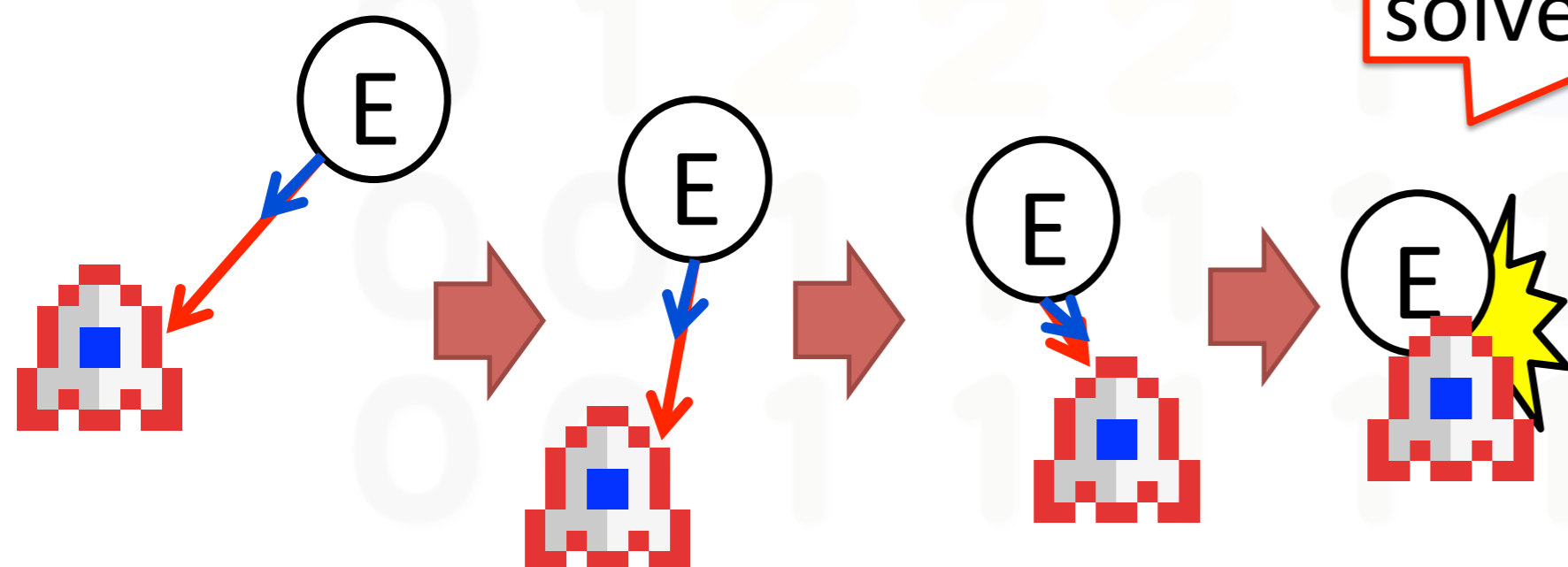


What is loaded from what to what?

Algorithm

Inescapable homing enemy

How do you solve this bug?



Other Topics

Lags (Network)

Game controllers (User Interface)

Game Engine (Software Engineering)

Framerate drop (Processing Unit)

Implementation

Introduction to computer science through video games (2010-, at Okayama University)

- An elective general course for every student who doesn’t have enough basic knowledge of CS
- A total of 15 lessons, each 90 min long
- Lectures of basic CS theory and applications with a variety of videos & screenshots of video games

Result

- High attendance rates
- Keeping and improving the students’ motivation for learning CS