

Optimization.

What's optimization?

POTATO PEELER MACHINE

Split into 4 groups

POTATO PEELER MACHINE

Group 1:

- Design a potato peeler that **peels as many potatoes as possible in a short time.**

POTATO PEELER MACHINE

Group 2:

- Design a potato peeler that **produces as little waste as possible while peeling**

POTATO PEELER MACHINE

Group 3:

- Design a potato peeler that **is as cheap as possible to build and operate**

POTATO PEELER MACHINE

Group 4:

- **Figure out what on earth is the point of this exercise.**

POTATO PEELER MACHINE

- Descriptions should be single sentences, nothing too complicated.
- Looking for concepts, not finished designs!
- Go!

POTATO PEELER MACHINE V2

- What do we get if we swap optimization targets now?
- Throughput → less waste
- Less waste → cheap
- Cheap → throughput
- (etc)

OPTIMIZATION TARGETS

- Speed (i.e, frame rate).
- Size:
 - Memory limits.
 - Storage media limits (also: download time).
 - Bandwidth limits.
- Fun.
- Other criteria too!

HOW DO WE OPTIMIZE?

- Measure.
- Find bottlenecks.
- Do things more efficiently.
 - Better algorithms.
 - Hardware-friendly implementation (assembly).
 - Or most commonly, don't do things if possible.

FRAMES PER SECOND?

 ... wants to see this octopus's garden.

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MILES-PER-GALLON IS JUST STUPID

The United States should measure fuel consumption the way the entire rest of the world does: consumption over distance.

Mon Jul 12, 2010 10:27 AM ET

Content provided by John Voelker, GreenCarReports

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THE GIST

- The National Research Council states that fuel economy should be displayed as fuel consumed.
- But Americans are stubborn and cling to MPG, which hide true fuel economy.

GreenCarReports.com reports that the National Research Council has stated that measuring a car's gasoline use with the familiar miles-per-gallon (MPG) measure is

FRAMES PER SECOND?

- FPS is common, but confusing.
 - "I optimized this routine to be 2 FPS faster"
- mspf is better
 - "I optimized 5ms per frame from this routine"
- Routines to get current time in ms:
 - Win32:GetTickCount, SDL:SDL_GetTicks

SIZE: MEMORY

- To optimize memory usage, you need to be able to measure it.
 - Commonly, this means writing your own memory manager.
 - ..here be dragons..
 - Alternatively, look at your code, figure out what takes space, and see what you can do about it.
- On desktop windows, not usually a problem (until your project grows..)
 - Task manager can show rough memory use

SIZE: STORAGE

- Disk space, download size, etc.
- Easy to measure.
- Relatively easy to optimize.
 - Compress.
 - Generate.
 - Leave out.

SIZE: BANDWIDTH

- Again, measure.
- Some optimization tactics:
 - Leave data out (predict, extrapolate)
 - Encode more efficiently (arithmetics)
 - Compress

FUN

- Test.
- Test.
- Test.
- Let other people play, *listen to their comments.*
- Test.

OTHER CRITERIA

- Tradeoffs.
 - Space vs time.
 - Everything vs development time.
- AI optimization.
 - How can we make Bob find Alice sooner?
- Usability optimization.
 - Too much text, confusing user interfaces..

WHEN NOT TO OPTIMIZE

- "Premature optimization is the root of all evil"
 - Donald Knuth
- When writing code, optimize for readability, not speed!
 - You'll end up spending most of your time re-reading your own code, so better make it understandable.