

CS207

SYSTEMS DEVELOPMENT FOR COMPUTATIONAL SCIENCE

AKA

COMPUTER SCIENCE FOR SCIENTISTS

CONCEIVED WITH LOVE @ IACS



Parsifal - Act I (partial) & Act II

Richard Wagner (1813 - 1883)

Gurnemanz
Second Knight
Second Esquire
First Esquire
First Knight
Kundry
Amfortas
Third Esquire
Fourth Esquire
Parsifal
Tituriel
Klingsor
Flower Maidens

LUDWIG WEBER
THORSEINN HANNESSON
MONICA SINCLAIR
ADELE LEIGH
RHYDDERCH DAVIES
KIRSTEN FLAGSTAD
SIGURD BJORLING
WILLIAM McALPINE
JOHN CAMERON
FRANZ LECHLEITNER
MICHAEL LANGDON
OTAKAR KRAUS
ADELE LEIGH, PATRICIA HOWARD,
LEONNE MILLS, AUDREY BOWMAN
BLANCHE TURNER, BARBARA HOWITT

Siegfried - Act III (partial)

Siegfried
Wanderer
Brünnhilde

SET SVANHOLM
KENNETH SCHON
KIRSTEN FLAGSTAD

Chorus and Orchestra of the Royal Opera House, Covent Garden, London

June 16, 1951 (Parsifal)

June 2, 1949 (Siegfried)

Karl Rankl, conductor

A COURSE IN 3 ACTS (MILESTONES):

I. THE SCAFFOLDING

II. ACCESS TO THE DATA

III. THE INDIVIDUAL GLORY



...AND WITH 3 SIMULTANEOUS SCENES...

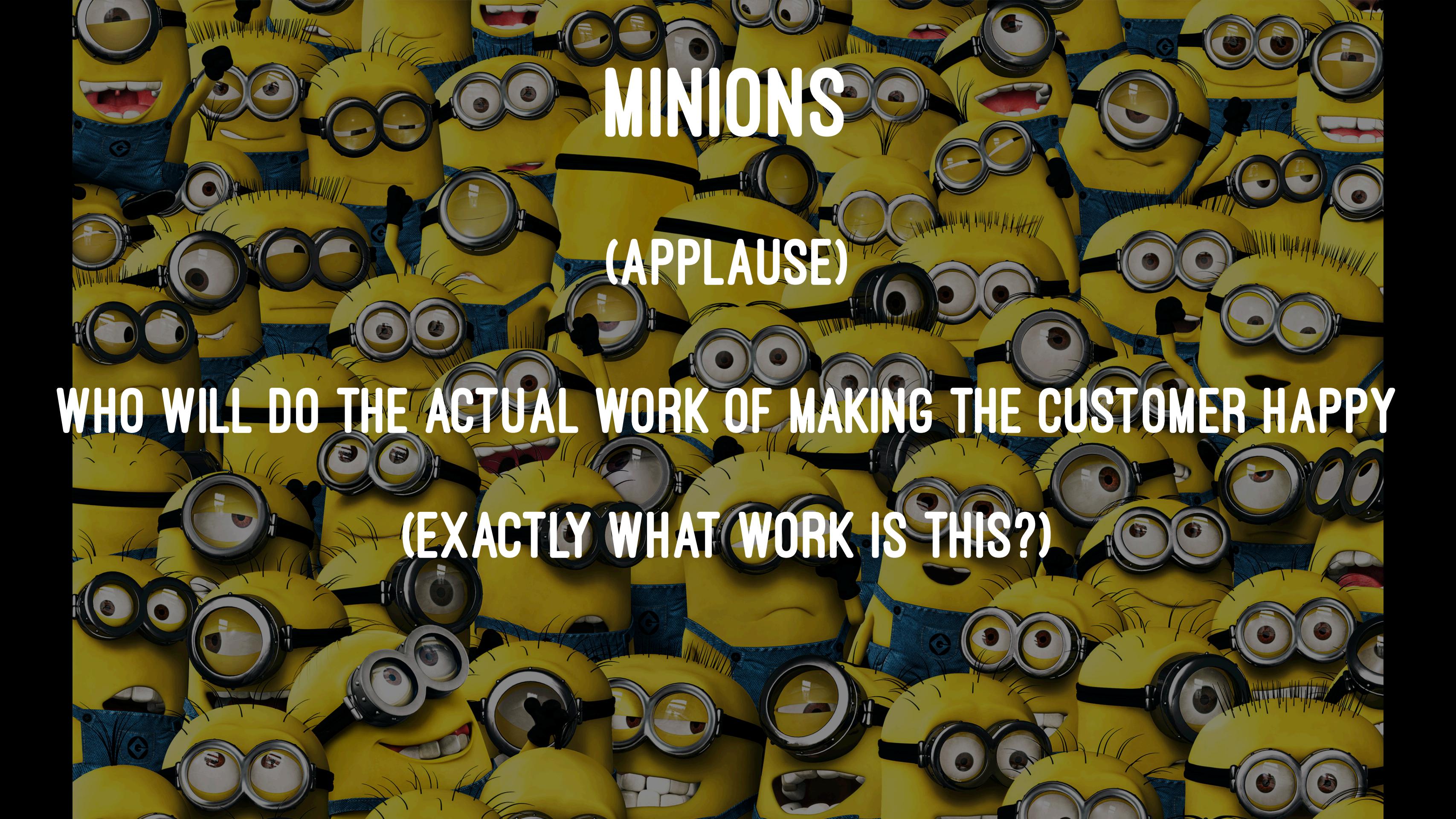
1. ENGINEERING A TIGHT
SHIP

2. WHAT'S IN THE
LANGUAGE

3. MUHAMMAD IBN
MUSA AL-KHWARIZMI
FINDS DATA.

DRAMATIS PERSONAE

- > PAVLOS PROTOPAPAS (THE CUSTOMER)
 - > RAHUL DAVE (THE TALKATIVE OFFICE MANAGER)
 - > BOB ADOLF (THE HEAD ADVISER)
 - > CHENHUI HU AND ... (THE ADVISERS)
- AND FEATURING THE...



MINIONS

(APPLAUSE)

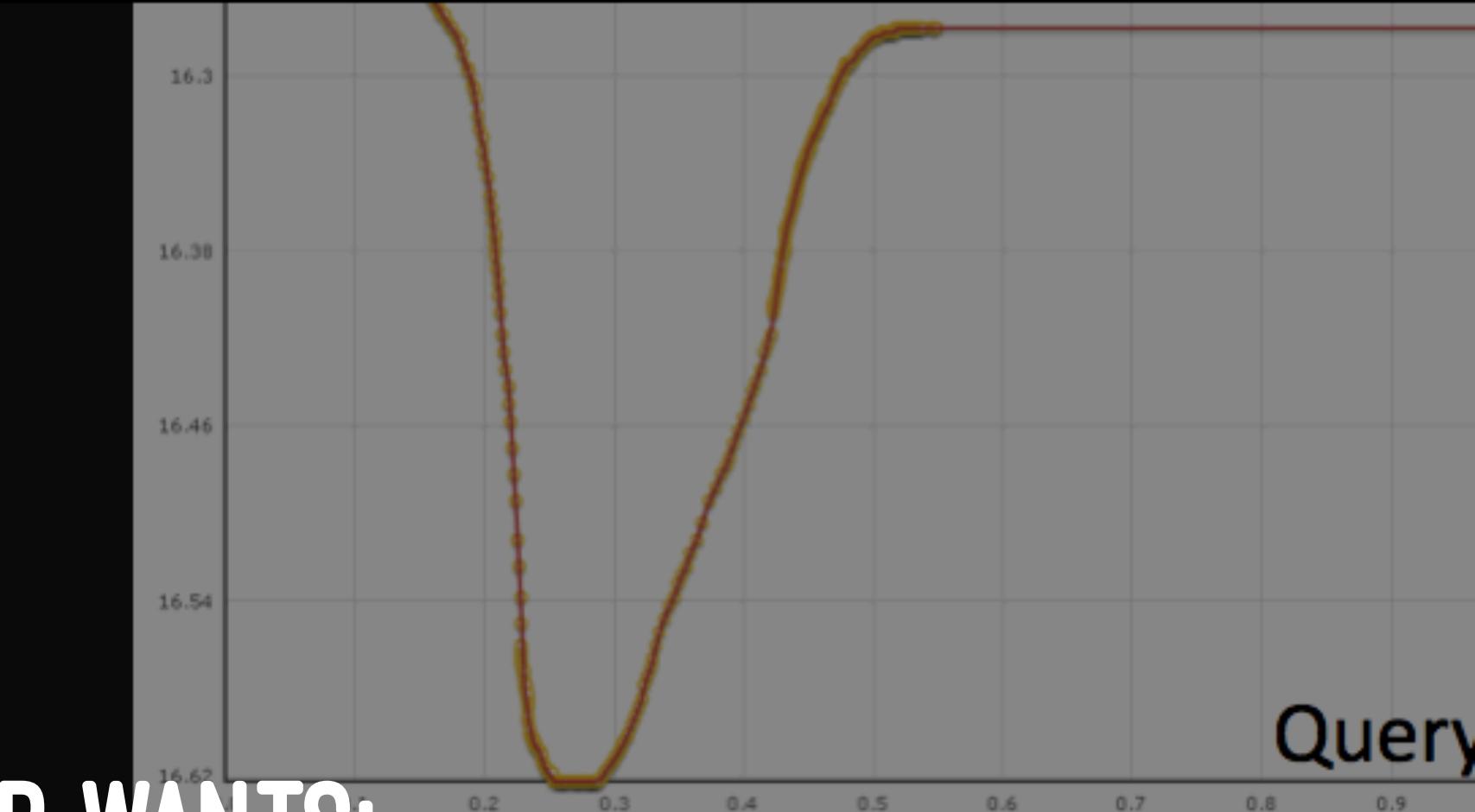
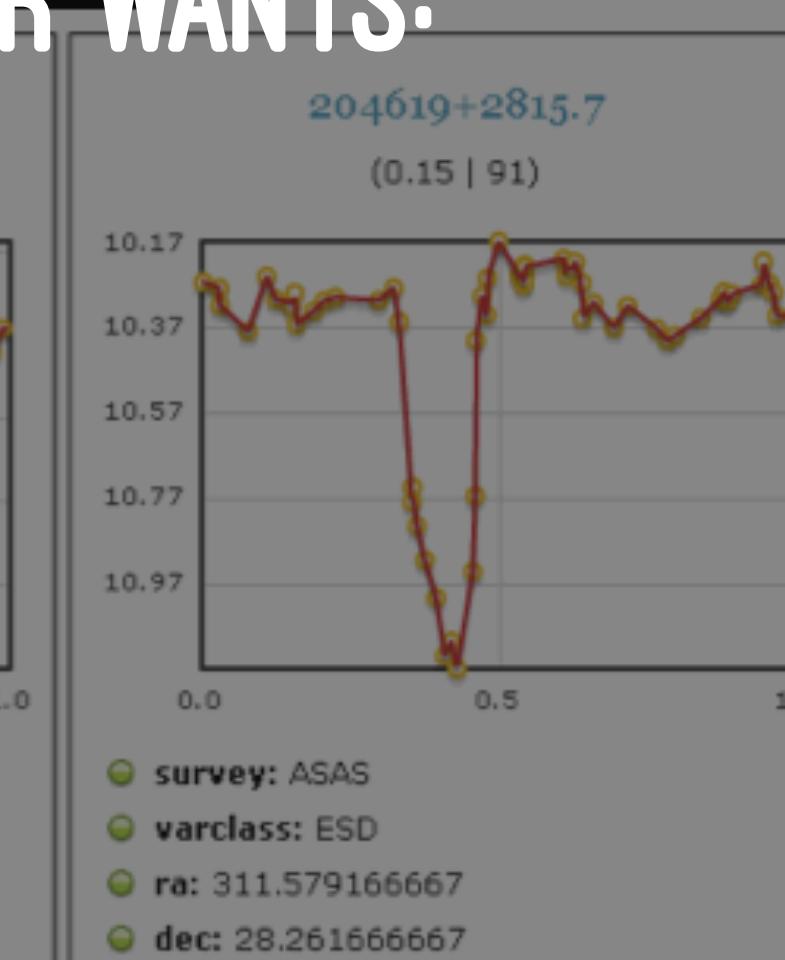
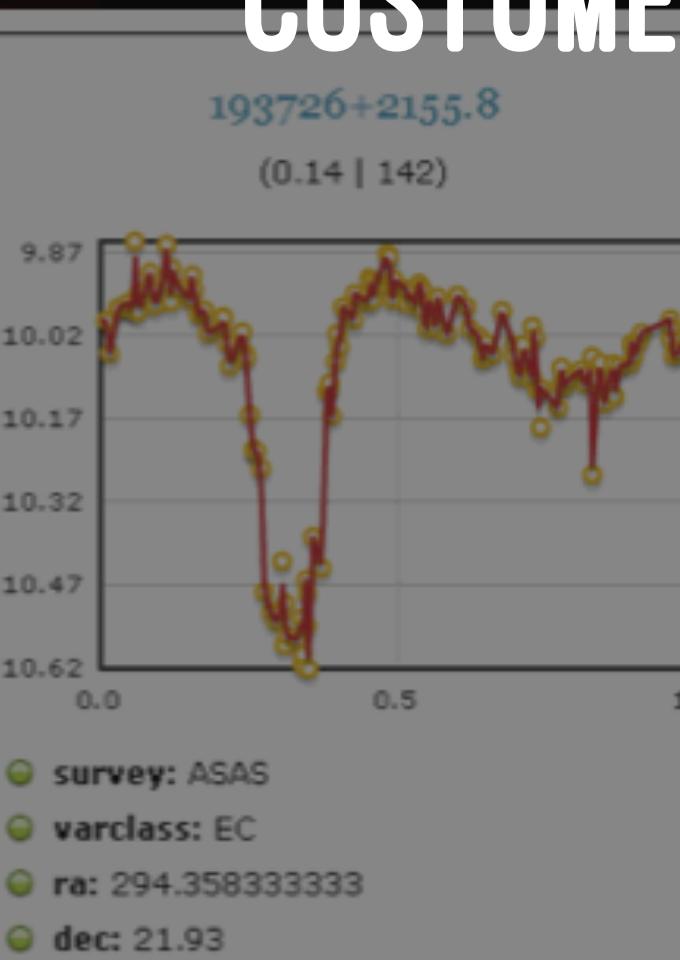
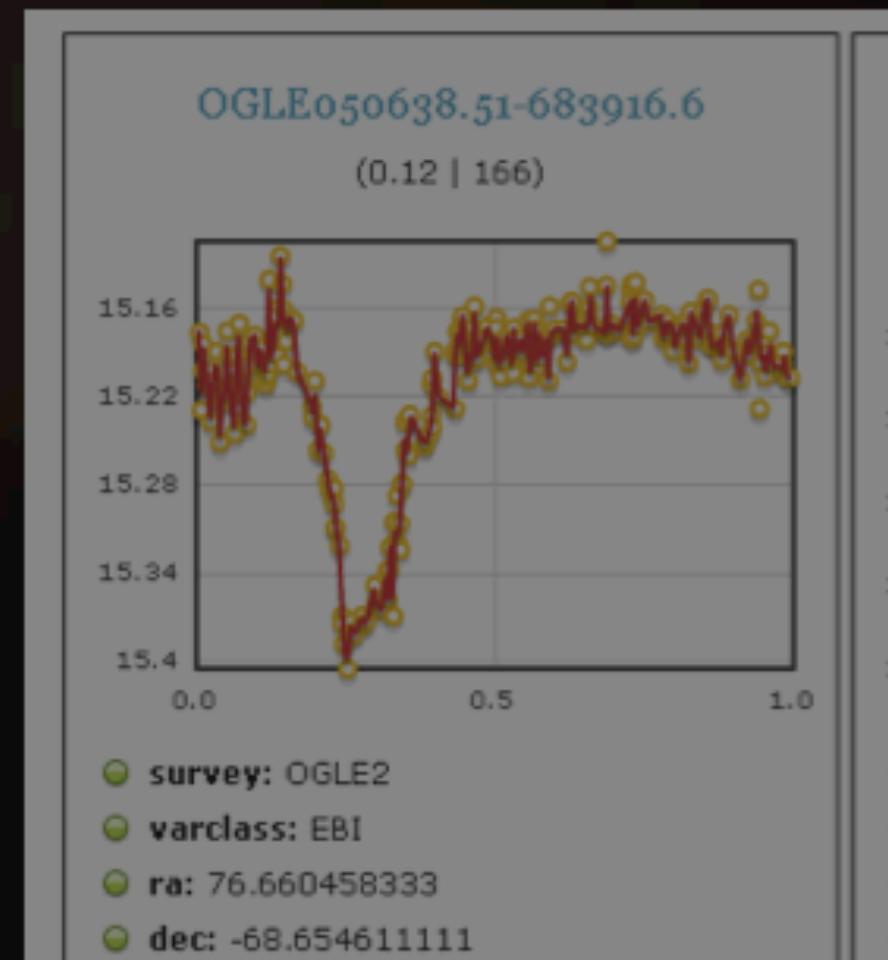
WHO WILL DO THE ACTUAL WORK OF MAKING THE CUSTOMER HAPPY

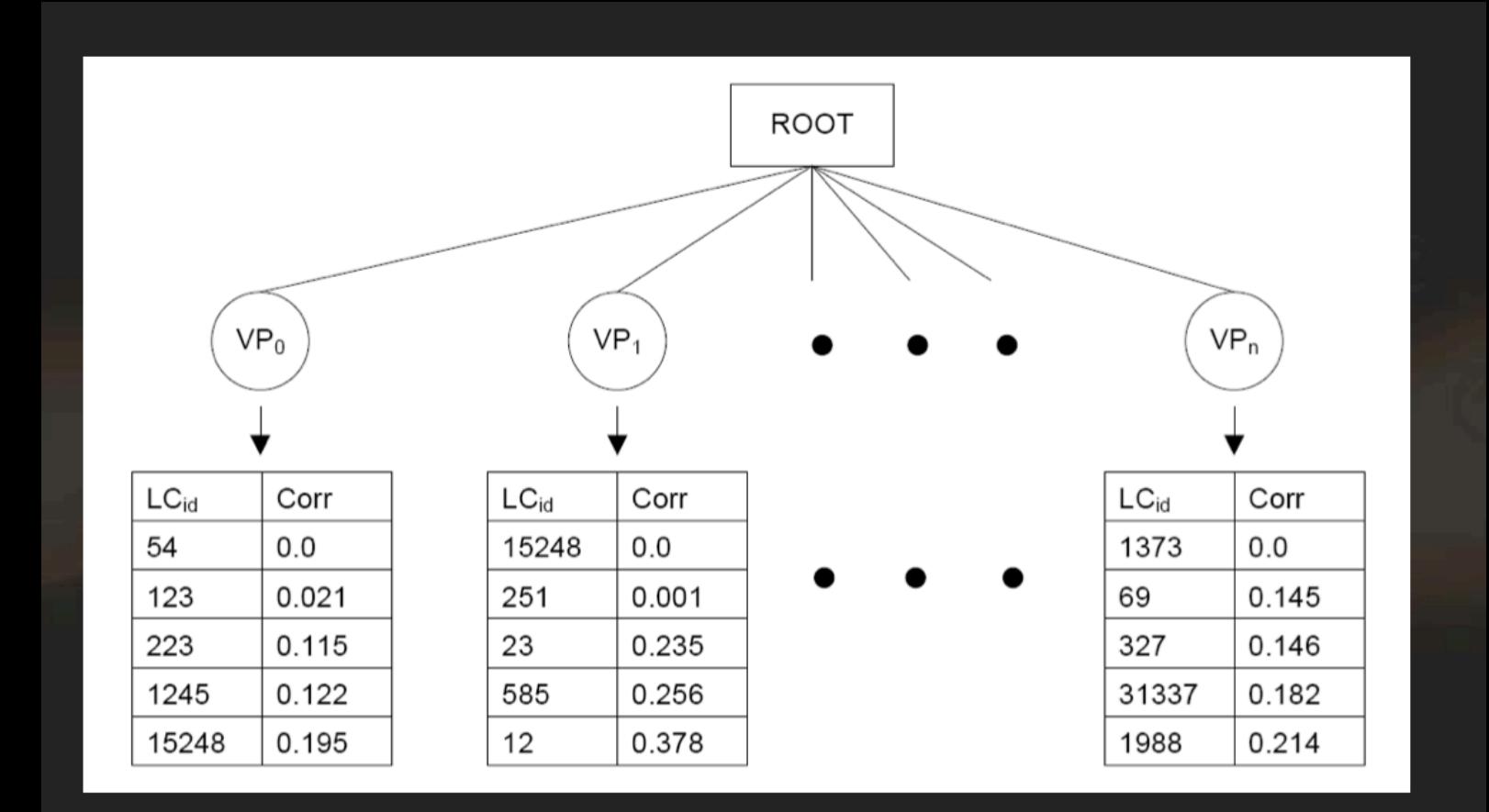
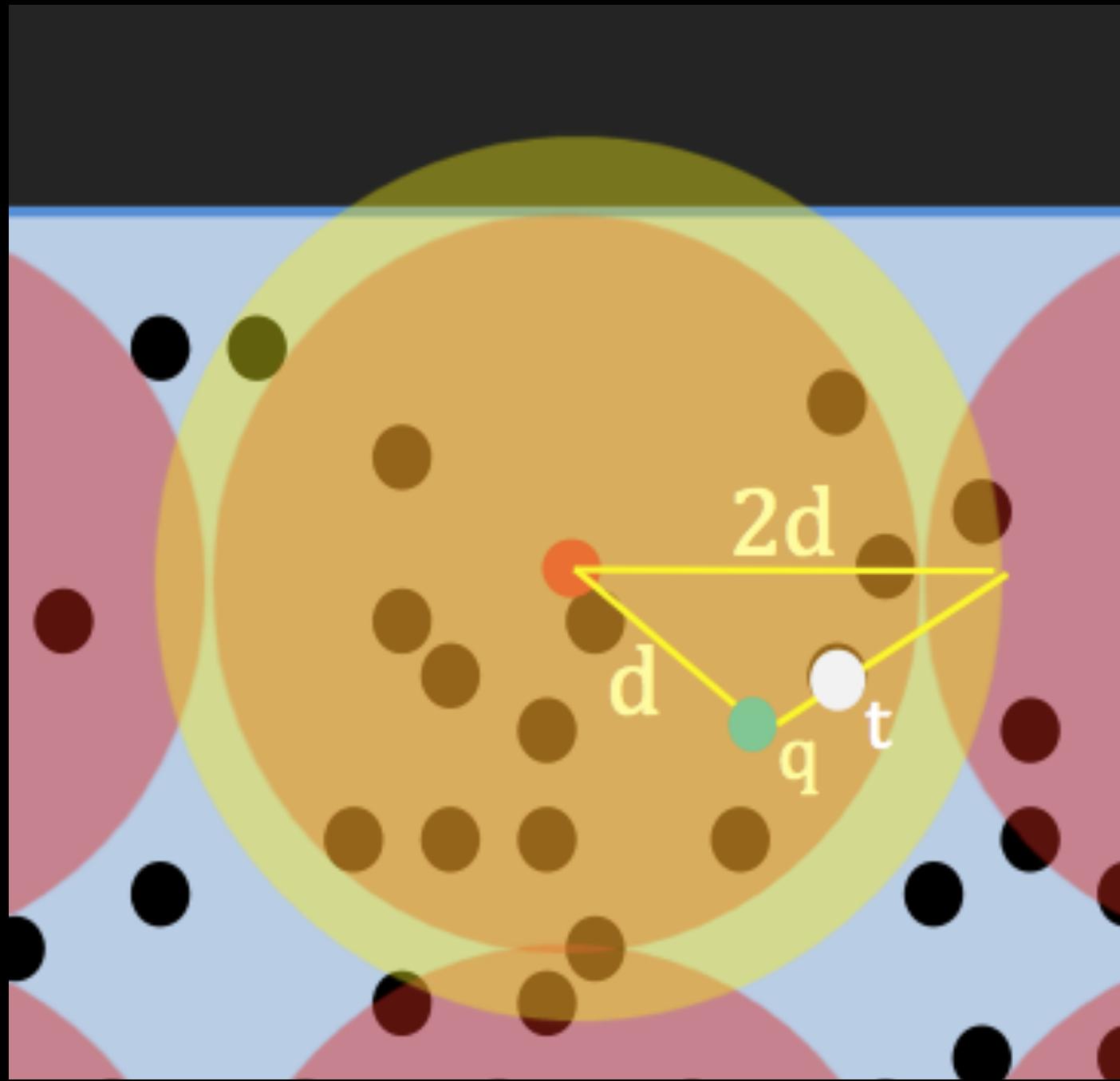
(EXACTLY WHAT WORK IS THIS?)

Problem.

- Searching Light Curves
- 100-1000 Data-points

CUSTOMER WANTS:





KNN SEARCH IN A LARGE SPACE. LEADS TO AN INDEX...

I. A TIME SERIES LIBRARY

(WITH OPERATIONS BETWEEN, AND ALGORITHMS ON TIME SERIES)

- > PYTHON AND C
- > EXECUTION MODEL, PROGRAMMING PARADIGMS, OBJECT MODEL
- > SEQUENCES, ITERATORS, LISTS, ARRAYS, TREES, HASHES
- > TESTS, DEBUGGING, CI, AUTOMATING
- > PROFILING AND PERFORMANCE

II. A TIME SERIES DATABASE

(WITH INDEXING, SIMILARITY QUERIES, QUERY LANGUAGE, AND CONCURRENT ACCESS)

- > WRITING A CLI, A REPL, A DSL, A COMPUTATIONAL GRAPH
 - > CONCURRENT ACCESS USING THREADS, ASYNCIO
- > APPROPRIATE ON-DISK DATA STRUCTURES FOR THE INDEXES AND TS
 - > PERFORMANCE

III. A REST INTERFACE TO THESE AND MORE

(THE MORE IS YOUR CHOICE, BUT YOU MUST DELIVER A DEMO)

- > YOU WRITE AN EXTENSION OF YOUR CHOICE
- > YOU PACKAGE EVERYTHING UP IN ONE OR MORE SERVERS.
ACCESSED BY A
WEB API, AND PROVIDE A DEMO

HOW?

- > ALL WORK IS ON GITHUB. ONE REPO FOR YOU LABS PER PERSON.
 - > YOU WILL SUBMIT LABS INDIVIDUALLY, UPTO 3 A WEEK.
- > YOU WILL WORK IN GROUPS OF 4-5. YOU CAN COLLABORATE AS MUCH AS YOU WANT WITHIN THE GROUP (INCLUDING LABS).
 - > ONE REPO PER GROUP FOR YOUR PROJECT.

HOW (CONTD)

- > THE BASIC PART OF THE PROJECT (I AND II) WILL BE DONE BY ALL GROUPS.
- > ONCE EVERY MILESTONE A GROUP WILL IMPLEMENT A FEATURE FOR ANOTHER GROUP
- > GROUPS WILL DO DIFFERENT THINGS FOR THE ELECTIVE PART AND REST API
- > THERE IS A (SMALL) PAPER ON OPTIMIZATION OF A SCIENCE ALGORITHM (GROUP)

WHEN?

- > MONDAYS 2.30PM – 5PM LECTURE AND LAB+GROUP MEETING.
(BOTH COMPULSORY) PIERCE 301
- > WEDNESDAYS 2.30PM – 4.30PM (LECTURE COMPULSORY, LAB
HIGHLY RECOMMENDED) PIERCE 301
- > FRIDAYS 4PM-6PM (LECTURE COMPULSORY, LAB HIGHLY
RECOMMENDED) PIERCE 301 (THIS TIME MIGHT CHANGE)

MONDAY LABS ARE COMPULSORY.

WED AND FRI LABS HIGHLY RECOMMENDED.

**IF YOU COME YOU WILL AT-MOST HAVE 1/2 HOUR TO 1 HOUR
ADDITIONAL LAB WORK LATER.**

NO LATE DAYS ON LABS. A WEEK'S LABS ARE DUE SUN 11.59 PM.

GRADE

- > LABS (30%): 15% JUST DOING THEM, 15% GRADING
 - > PAPER (10%) IN M2
 - > PROJECT (50%): BASIC (30%). ADDITIONAL (20%)
 - > PARTICIPATION (10%): IN DISCUSSIONS, COMMITS, PEER REVIEW AND CODE REVIEW EXERCISE IN M1
- YOU WILL PEER-REVIEW EACH OTHER.

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- A white unicorn with a golden horn is running across a green grassy field. In the background, there are trees and a building with red roofs. The unicorn is moving from left to right, kicking up some grass as it goes.
- › FUN IS GUARANTEED!
 - › LOTS OF COOL STUFF TO LEARN
 - › LEARN TO LEARN. NOT TO GET A GRADE

UNICORN LEVEL 1 UNLOCKED.