# WHY DO WE NEED A DATABASE TO STORE DATA?

LET'S TAKE A REAL WORLD EXAMPLE OF AN INFORMATION SYSTEM - WE PLACE TREMENDOUS DEMANDS ON SUCH A SYSTEM

# ALL OF THESE HOLD DATA

SAY YOU'RE PLANNING TO SET UP A LARGE E-COMMERCE SITE... KIND OF LIKE FLIPKART OR AMAZON

THERE IS A LOT OF TECHNOLOGY BEHIND RUNNING A GOOD E-COMMERCE SYSTEM

THE WEBSITE OR THE MOBILE PHONE APP

ORDER MANAGEMENT SYSTEMS

SELLER SYSTEMS TO ONBOARD NEW MERCHANTS

THE SEARCH SYSTEM

RECOMMENDATIONS

CART, CHECKOUT AND PAYMENT SYSTEMS

SUPPLY CHAIN AND LOGISTICS SYSTEMS

THE CATALOG OF PRODUCTS

# ORDER MANAGEMENT SYSTEMS

THESE ARE CORE PIECES YOU INTERACT WITH EACH TIME YOU BUY ON AN E-COMMERCE PLATFORM

IT KNOWS WHETHER THE PRODUCT YOU'RE LOOKING FOR IS AVAILABLE - KEEPS TRACK OF INVENTORY

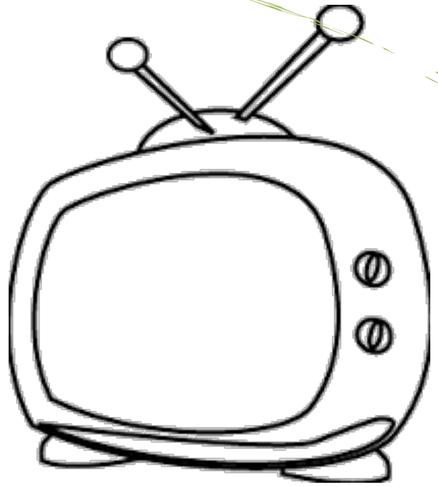
ONCE YOU BUY SOMETHING IT TRACKS THIS PIECE OF INFORMATION AND THE STATUS OF YOUR ORDER FROM PACKAGED, TO SHIPPED TO DELIVERED

IT STORES THIS INFORMATION FOR A LIFETIME

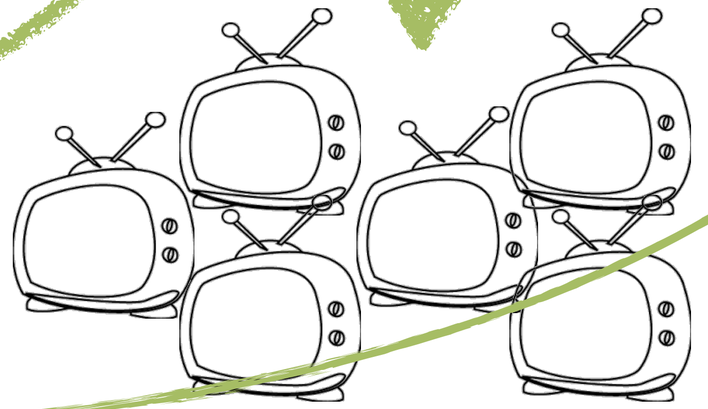
WITH THIS INFORMATION IT CAN POWER PERSONALIZED SEARCHES, RECOMMENDATIONS AND WHOLE BUNCH OF STUFF WHICH MAKES YOUR USER EXPERIENCE AWESOME

# LET'S IMAGINE THE INFORMATION THIS SYSTEM HAS TO WORK WITH

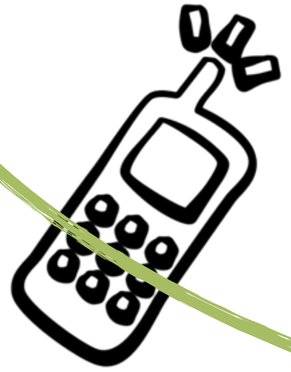
BUYS



AVAILABILITY



SHIPS TO



# LET'S IMAGINE THE INFORMATION THIS SYSTEM HAS TO WORK WITH

NAME

PHONE

ADDRESS

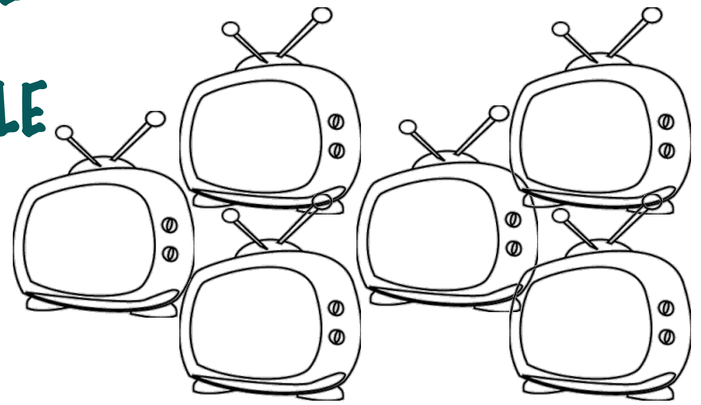
PRODUCT NAME

SPECIFICATIONS

## ORDER

PRODUCT NAME

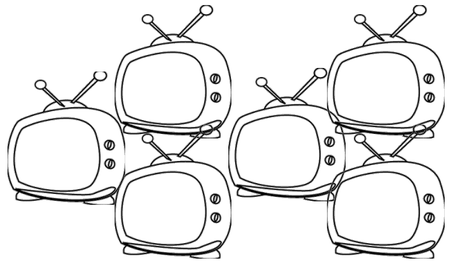
UNITS AVAILABLE



# LET'S IMAGINE THE INFORMATION THIS SYSTEM HAS TO WORK WITH

CUSTOMER NAME
PHONE
ADDRESS

PRODUCT NAME
SPECIFICATIONS



PRODUCT NAME
UNITS AVAILABLE

## ORDER

CUSTOMER NAME
PRODUCT NAME
QUANTITY
TIMESTAMP

# WHAT DO WE WANT THE ORDER MANAGEMENT SYSTEM TO DO?

WORK CORRECTLY...

WELL, YES BUT WHAT DOES CORRECTLY MEAN?

ALLOW AN ORDER TO BE PLACED ONLY WHEN THERE IS AVAILABLE INVENTORY

REDUCE THE AVAILABLE ITEMS ONLY WHEN THE ORDER WAS SUCCESSFULLY PLACED

INCLUDE THE CORRECT AND VALID PRODUCT IN THE ORDER

ENSURE THE REDUCTION IN INVENTORY IS EQUAL TO THE NUMBER OF ORDERS FOR THAT PRODUCT

HAVE THE CORRECT AND VALID STATUS FOR THE ORDER

ASSIGN THE ORDER TO THE CORRECT AND VALID CUSTOMER

# WHAT DO WE WANT THE ORDER MANAGEMENT SYSTEM TO DO?

## WE'RE NOT DONE YET, THERE'S MORE!

### NOT LOSE INFORMATION... EVER

IT'S BACKED UP IN THE CASE OF CATASTROPHIC FAILURES

### RECOVER FROM FAILURES

GET BACK INTO A SANE STATE WHEN RECOVERING FROM ERRORS

### BE SECURE

NOT EXPOSE INFORMATION TO THOSE WHO DO NOT HAVE THE AUTHORITY

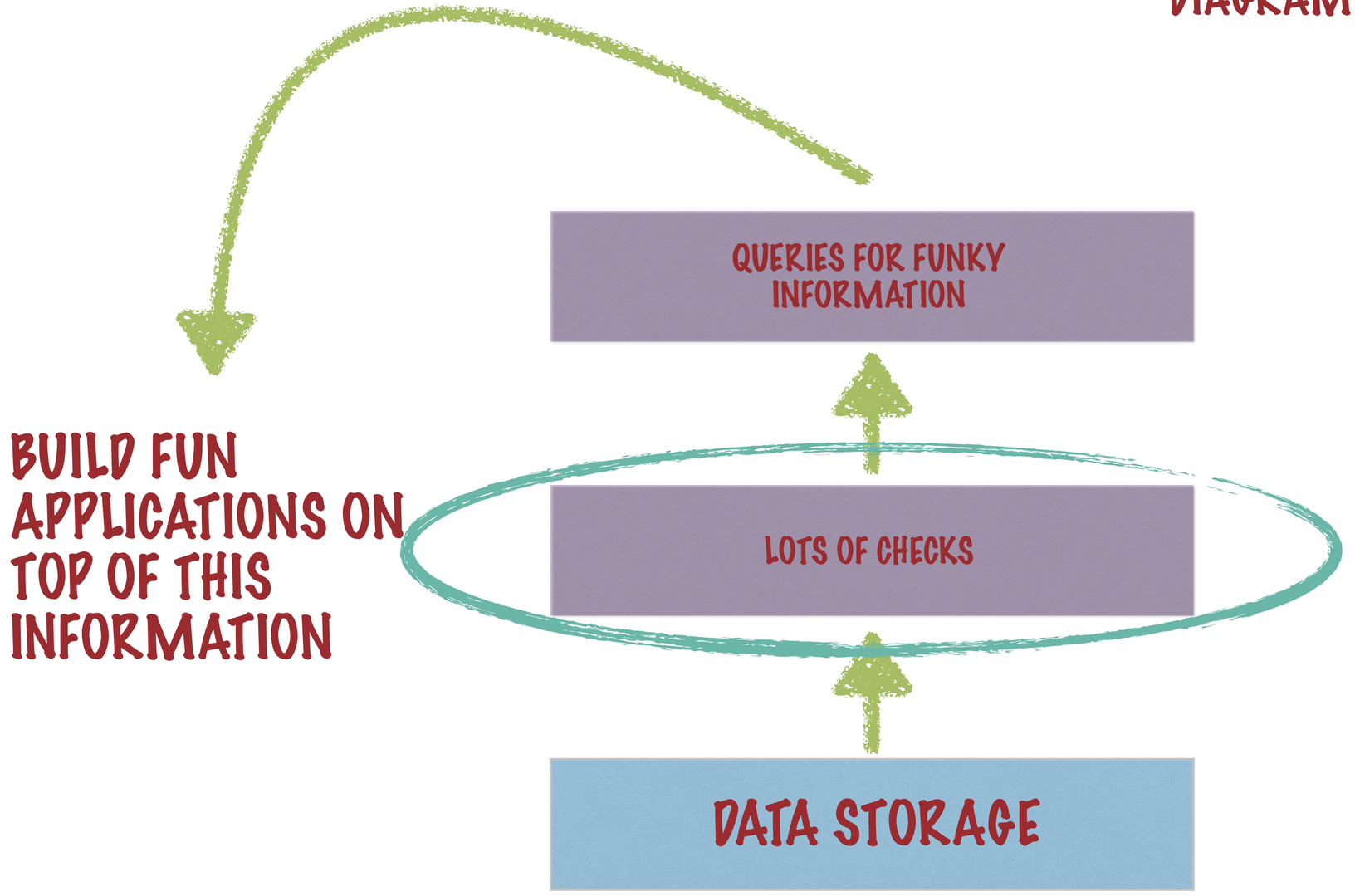
### ALLOW MULTIPLE PEOPLE TO ACCESS AND MODIFY DATA AT THE SAME TIME

THE DATA SHOULD STILL MAKE SENSE TO EVERYONE

THAT IS A FORMIDABLE LIST OF REQUIREMENTS

# THAT IS A FORMIDABLE LIST OF REQUIREMENTS

CONSIDER THE OVERALL BLOCK DIAGRAM OF SUCH A SYSTEM

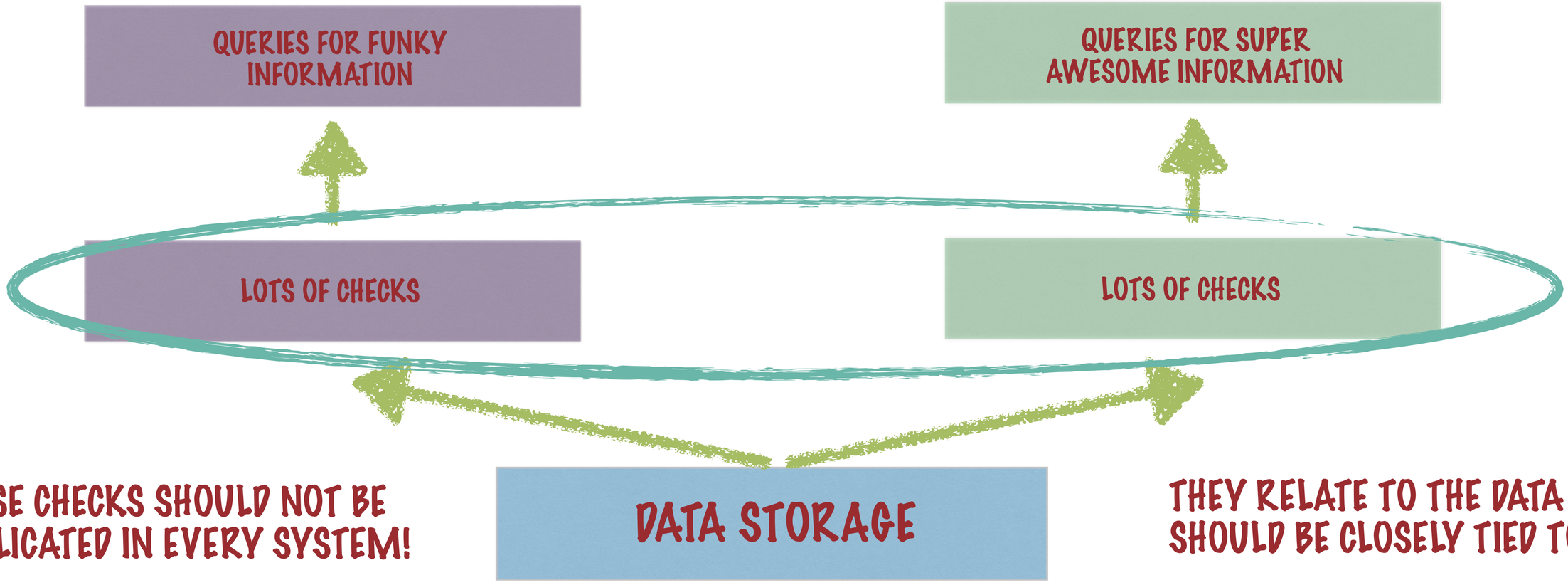



BUILD FUN APPLICATIONS ON TOP OF THIS INFORMATION

1. CORRECTNESS
2. VALIDITY
3. SECURITY
4. DURABILITY
5. RECOVERABILITY
6. ATOMICITY
7. CONSISTENCY
8. CONCURRENCY
9. INTEGRITY

# THAT IS A FORMIDABLE LIST OF REQUIREMENTS

NOW SUPPOSE WE WANT TO BUILD UP A COMPLETE DIFFERENT SYSTEM FROM THE SAME DATA - THE "SUPER AWESOME SYSTEM"

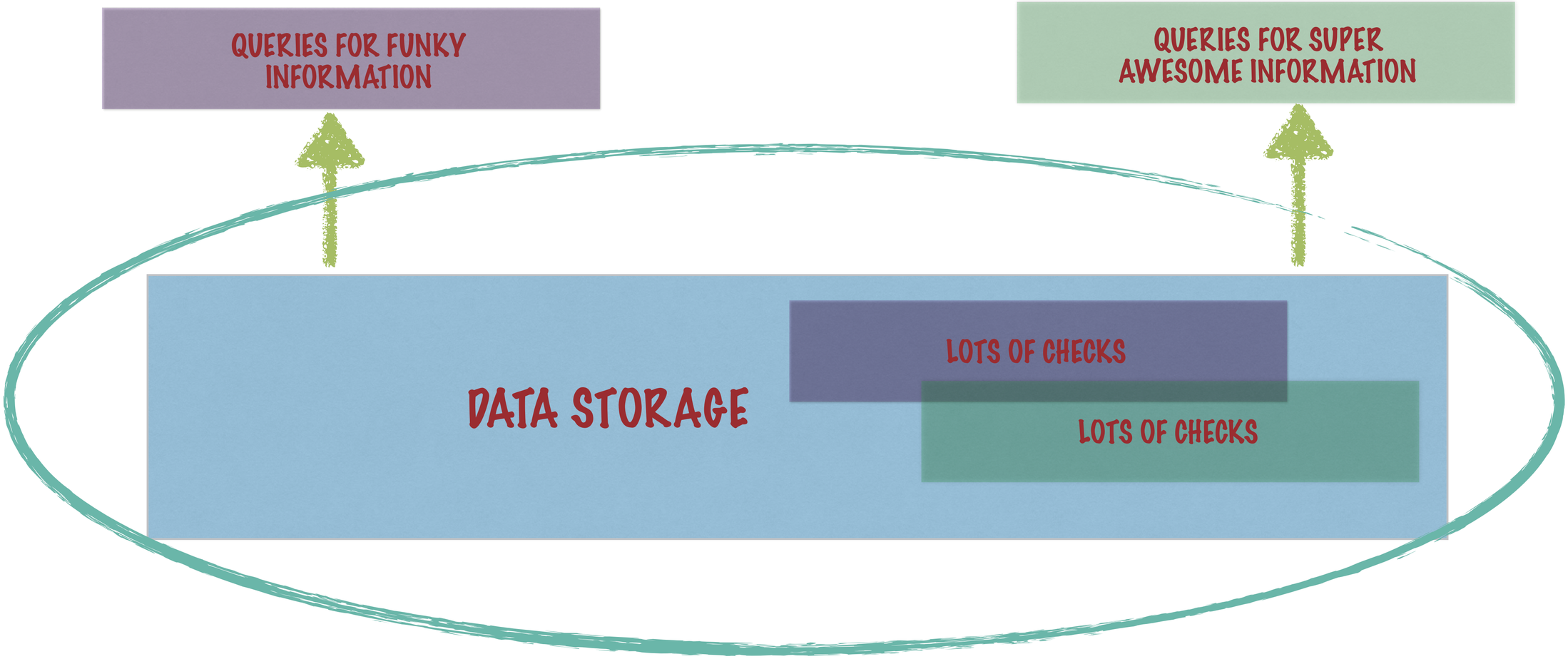



THESE CHECKS SHOULD NOT BE REPLICATED IN EVERY SYSTEM!

THEY RELATE TO THE DATA AND SHOULD BE CLOSELY TIED TO IT

# THAT IS A FORMIDABLE LIST OF REQUIREMENTS

## THE DATABASE MANAGEMENT SYSTEM DBMS



# DEFINITION OF A DBMS

A database is a collection of structured data, an abstract representation of some domain

SOMETHING IN THE REAL WORLD

A database management system is a complex piece of software that sits in front of a collection of data and mediates access to the data guaranteeing many properties of the data and the access

ALL THE CHECKS