



Learning to Speak like a Developer

Presented by: Leantha Naicker, Avi Jivan
& Danielle Winter

Hello World

I AM AVI JIVAN

I wish I could adopt all the dogs.
Alas, I volunteer at shelters
until then

You can find me at:
linkedin.com/in/arjivan/



A Day in the Life of a Business Analyst

- Stakeholder management and negotiations
- Requirement gathering, analysis, and documentation
- Application testing
- Production support

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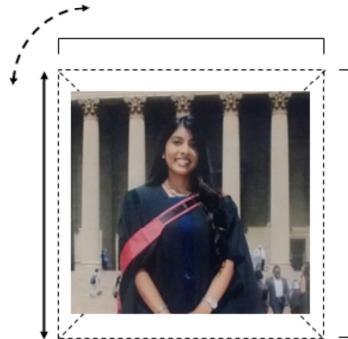
- Stakeholders are entities that influence or are impacted by the product being created
- Requirements defining the project (problem and solution) must be defined and articulated
- Software applications must be tested to ensure they satisfy the requirements and deliver value to users
- There are likely to be defects (difference in expected and actual software behaviour) after a project has been delivered and is being used. It's important to fix these bugs to ensure user satisfaction

Hello World

I AM LEANTHA NAICKER

I am here because I want to get more females involved in the software development space.

You can contact me at:
leantha.naicker@entelect.co.za



A Day in the Life of a Software Engineer

- Build screens
- Create the logic that gives functionality
- Ensure the correct information is sent between the user and the app
- Test functionality and usability
- May work with one or more of the following: Java, .NET, Python, Ruby, MySQL, MongoDB, CSS, HTML, JavaScript, Angular

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Leantha

- Look at designs, specifications, requirements to build screens on android mobile applications that end users will see on their phone screens when using the application.
- Creating the processes that happen when a user interacts with a screen.
Eg. Clicking a button should cause an expected action
- Test that Application/Feature does what it is suppose to do when it is suppose to do it; but also testing the screen/s look the way they are suppose to and make sense to the user.

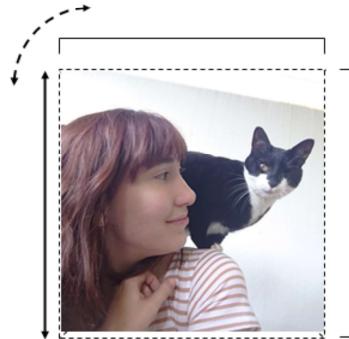
Hello World

I AM DANIELLE WINTER

I have a one-eyed cat called Lorey who loves to interrupt my video calls and change settings on my PC.

You can find me at:

linkedin.com/in/danielle-winter-230637128



A Day in the Life of a Data Scientist

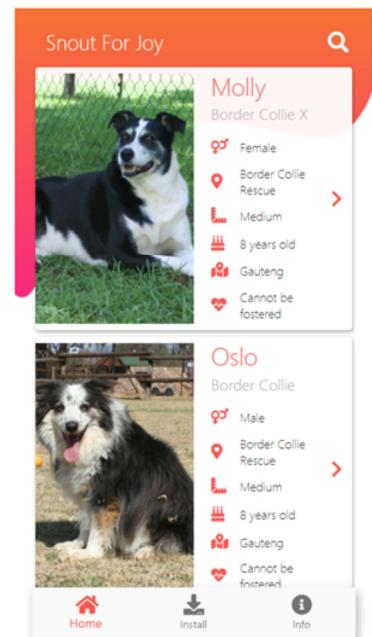
- Data collection and logging
- Establish data pipelines and data flow
- Data cleaning and formatting
- Extract features from data
- Build Statistics and Artificial Intelligence (AI) models to make predictions on data
- May work with one or more of the following: Power BI, Python, R, Apache Spark, Cloud services, MySQL

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Dani

- Data can be anything
 - Documents
 - Text
 - Video and audio
 - Images
 - Numerical data
 - Sometimes measured over time
- Data scientists work to get useful information out of that data – trying to find trends and make sense of anomalies. They then create models (representing the data as mathematical formulas) to try and predict trends and issues in new data.
- Most of the life of a data scientist is spent getting hold of data and building workflows that capture and clean it up automatically.
- Data is never perfect! You have to spend time dealing with missing data, outliers and incorrectly captured data
- Once you've spent the time to clean and understand the data, you start extracting "features" from the data. These are the characteristics in the data which indicate trends. This involves some fun maths and stats!
- You can then start building models which learn about these trends from the data and the information you pass to the model. With AI, we can use models to make predictions on new data and start making decisions before events even happen!

Let's Build a Pet Adoption Website



www.SnoutForJoy.com

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We'll use the example of a pet adoption website during this presentation.

The aim is to create a website that recommends suitable pets to potential adopters based on the characteristics of those adopters.

General Concepts...

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Software Development Life Cycle (SDLC)

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- A SDLC is a methodology with clearly defined processes for creating high-quality software
- Requirements gathering: Understand the business domain and business rules.
- Analysis: Elicit and document business and functional requirements that satisfy the business rules.
- Design: Screens, user journey, and technical architecture.
- Development: Implement the functional requirements and screen designs using coding languages.
- Testing:
 - By developers to ensure that the **code** behaves as the developer intended it to.
 - By testers to ensure that the **system** behaves as intended and that the business rules are satisfied.
- Implementation: Ensure that the software is distributed to users. This may be through a physical medium (such as CDs), or an online distribution platform. One example of an online distribution platform is the App store you access using your cellphone.
- Maintenance: Ongoing support and bug-fixes. (Note that a “bug” is an error, flaw or fault in software that causes it to produce an incorrect or unexpected result, or to behave in unintended ways)

SDLC Methodologies – Waterfall

- Linear, sequential phases of a project
- Each phase depends on deliverables of the previous phase
- Full plan at the beginning
- Hope there will not be changes in the plan or the requirement



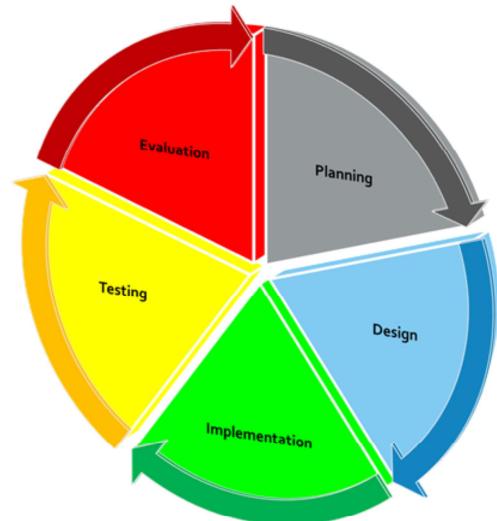
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- Analogy using actual water droplets in a water fall. Once the process of falling has begun, it must be seen through.
- Waterfall method requires that all the requirements and use cases be known up front, because you cannot go back a stage.
- Waterfall method is most useful when the project timeline is fixed and can not be moved, **Waterfall** will offer a more predictable outcome.

SDLC Methodologies – Agile

- Requirements and solutions evolve with the project
- Evolution occurs through a collaborative effort of self-organizing and cross-functional teams
- Perform ceremonies like sprint planning and sprint retrospectives

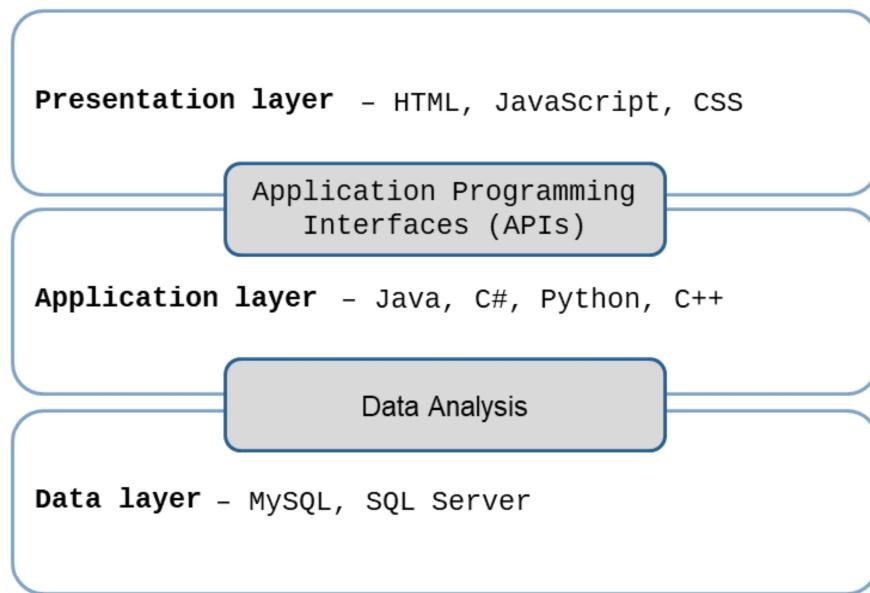


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- Agile follows the whole cycle in small iterations to deliver usable functionality at the end of each cycle.
- Can add and change requirements at the start of new iterations.
- Requires a lot of collaboration, communication and co-operation
 - Sprints – the iteration (usually 2 weeks but can differ)
 - Sprint Planning – creating and allocating tasks to accomplish in the sprint
 - Retrospectives – End of every sprint, have a meeting to discuss what went well, what went wrong and what can be improved in the next sprint

Layers of an Application



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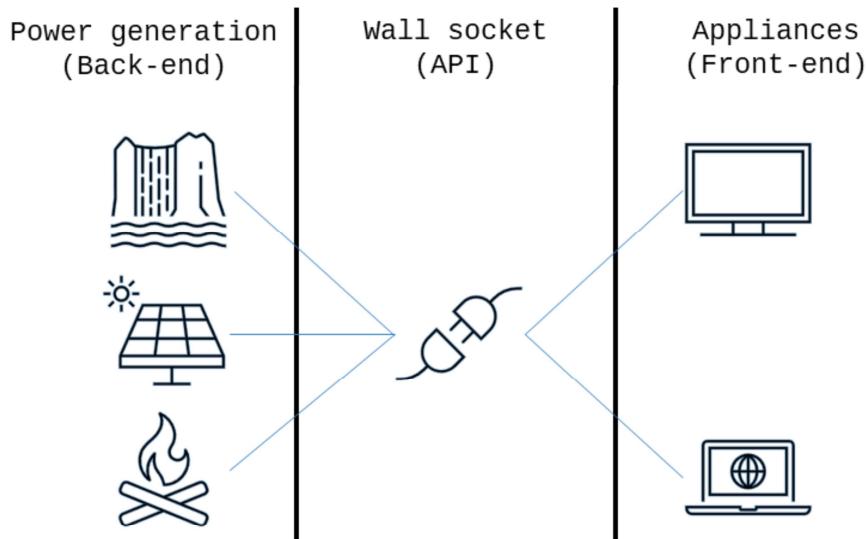
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- Presentation layer: It is what the user sees and interacts with
- Application layer: Business logic that implements business rules
- Data layer: Storage / persistence of data

Example: Viewing pets recommended for me

- The presentation layer displays pet images and details (like their name and breed) to the user
- The application layer orchestrates that only pets recommended for the user in context are fetched from the data layer
- The data layer stores the pet's details
- The presentation layer used an API to communicate with the application layer when fetching pets to display
- The application layer uses a data analytics algorithm to determine which pets to fetch based on attributes of the user (such as their level of physical activity)

Application Programming Interfaces (APIs)



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- Example: A wall socket. Power generation source and appliances can change independently of each other because the wall socket is the fixed contract to which both must abide
- Purpose: Separation of concerns so that the presentation and application layer can change independently of each other
- Benefit: Reduce the amount of code changes required and the risk of unnecessary bugs

Software Development...

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What is Software Development?

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- Software itself is the set of instructions or programs that tell a computer what to do.
- Software development refers to a set of computer science activities dedicated to the process of creating, designing, deploying and supporting software
- A software developer carries out software development through a coding language to meet an objective and will control the testing and maintenance of the software product.

What is a Coding Language?

English - Show user a message of "Hello World!"

C# - `Console.WriteLine("Hello
World")`

Python - `print("Hello World!")`

Compiler (translates source code from a high-level language to a lower level)

01001000 01100101 01101100 01101100 01101111 00100000 01010111 01101111
01110010 01101100 01100100 00100001

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What is a coding language?

- Like we have different languages in different areas of the world, we can think of computers as having their own language.
- Like English has 26 letters of the alphabet, with which we use to make up all our words for effective communication; the computer has an understands binary 1's and 0's to make up its language of effective communication.
- We do not understand 1's and 0's and the computer does not understand our languages...so we use code in abstraction of a language to translate between the human and the machine.

Developer Terminology

- Front-end vs Back-end?
- Full stack developers
- Framework vs language?
- Bugs
- Data Structures
- User Experience(UX) vs User Interface(UI) Design?



Decline

Accept

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Leantha:

- Front-end: Client/User side interface (What the user sees, touches and experiences)
Back-end: Server side interface (How everything works). Does not come into direct contact with the user but does communicate to the frontend
- Full stack developer is someone who is proficient in both front-end and back-end development.
- Language: Is the syntax. Grammar and semantics of how you talk to/instruct your program to work (e.g. Python, C#)
Framework: Cohesive set of library code that works to simplify the programming of any given language (e.g. Angular, Bootstrap)
- Bugs: A bug is an error that prevents a website /app from running as it should
- Data Structures: A way of organizing and storing data for maximum efficiency—much like books in a library. Data structures make it easy to find, access, sort, insert and delete data
- User Interface: UI design stands for user interface design, and it's all about the screens and interactive touchpoints that make up a website or an app. Swiping motions, scrollbars and clickable buttons are all part of UI design
User experience: UX design stands for user experience design, and it's all about providing a smooth, user-friendly experience for the end user as they navigate

around a website or an app.

Basic Building Blocks

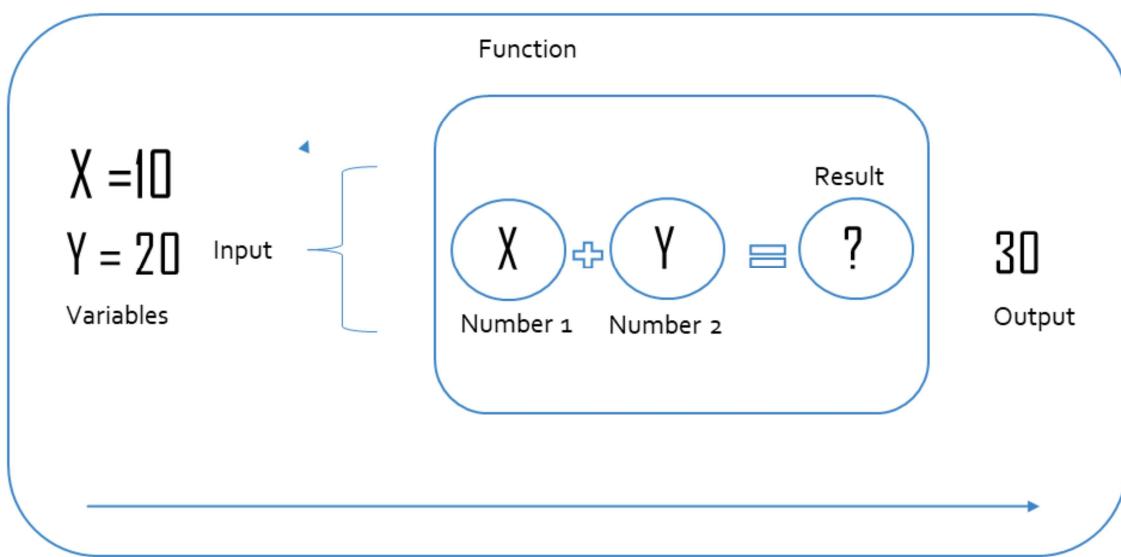
Term	Description
Variable	A symbol used to define a value that is liable to change
Data type	Constrains what a variable can be (for example, characters, strings, integers, arrays, or lists, boolean, enumeration)
Function	Transforms inputs into outputs
Parameter	Input to a function
Class	A blueprint/template and operations
Object	A virtual instance of an item created from a template (class)

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- A class is a template, with types of characteristics
- An object is a specific case of that class with the details of that characteristic

An example is downloading a blank CV from the Internet. This is your class/template with all the fields required to make up a CV. Once you capture your information, it becomes a unique object containing your information

Example: Summing Function



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- Go through example
- Function: Inputs change to desired outputs through a reusable process
- Variables can change, but the process remains the same to perform a functionality (Addition)

**Separate These into
the Layers of an
Application**



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Exercise: Separate These into the layers of an application

Remember the three layers of an application are the presentation layer, the application logic layer and the data layer

- C# - General purpose programming language that is commonly used to build business logic in the back-end
- Microsoft SQL Server – Relational database management system used for storing and retrieving data
- HTML (Hypertext Markup Language) – Used to create the structure of a website
- Java - General purpose programming language that is commonly used to build business logic in the back-end
- JavaScript – Programming language typically used to create interactive functionality on websites
- Python - General purpose programming language that is commonly used to build business logic in the back-end or to do data analysis
- C++ - General purpose programming language that is commonly used in situations where high performance is required (like video games) or where computational resources are limited (such as micro-chips)
- CSS (Cascading Style Sheets) – Used to create the styling (such as colours) of a website
- MySQL - Relational database management system used for storing and retrieving data

Presentation Layer			
Application Layer			  
Data Layer			

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Solution

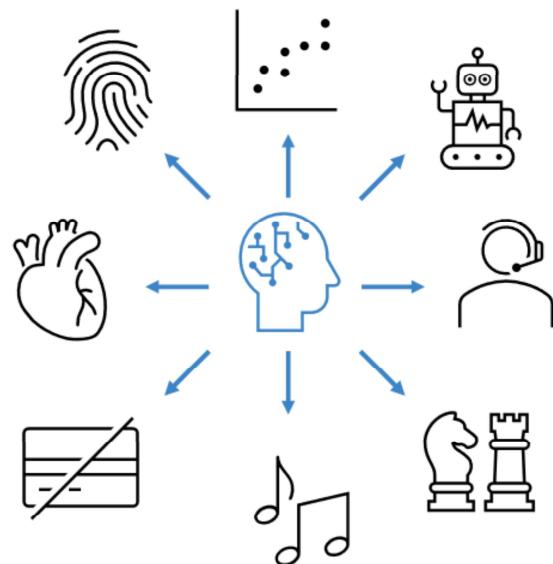
Data Analytics...

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Data Analytics Terminology

- Data
- Data Analytics
- Big Data
- Artificial Intelligence (AI)
- Machine Learning
- Model



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- Data – characteristics or information captured through measurement
 - Documents and forms
 - Images
 - Text, video, audio and speech
 - Numerical
- Data Analytics – the process of cleaning up and making sense of data and using mathematical formulas or “models” to automatically extract useful information
- AI – machines trying to mimic intelligent human behaviour to solve problems
 - This incorporates many things!
 - Robotics
 - Processing language, speech and text – Google assistant, Siri, Alexa, google search, chat bots
 - Solving routing problems – automated vehicles, solving puzzles
 - Picking up problems in credit card transactions which may indicate fraud
 - Trying to pick up problems in medical data (analysing MRI images to detect cancer automatically)
 - Face detection and recognition, fingerprint recognition
- Machine Learning – computer systems which learn and improve automatically through experience. ML is a field in AI. It's basically the fancy maths behind AI!
- Big data – really large data sets and the ways we analyse them. We typically can't analyse this data on a standard PC because your machine doesn't have enough memory and space to process it. The data needs to be broken up and analysed in different ways and often using powerful computers with lots of

- parallel CPUs.
- Model – mathematical formulas which can be used to describe data, the trends in data and make predictions on new inputs

What Are We Doing with Machine Learning?

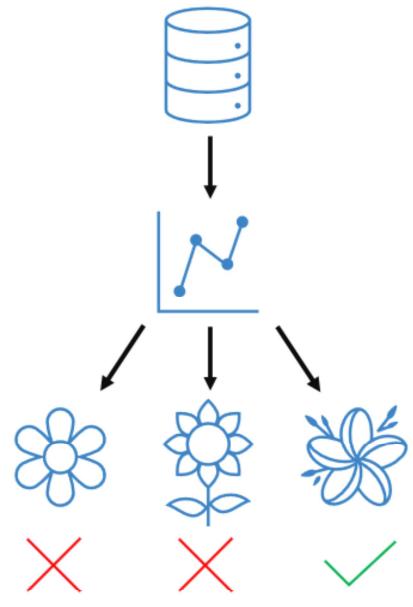


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- Typically when we build software and look at data, we take data as an input, write a computer program, pass the data through the program and get an output
- With Machine learning, what we're trying to do is give the computer some input data and the outputs we expect. The computer learns information from the data automatically and outputs a computer program or model that we can use. This is how we get machines to exhibit human-like intelligence

Data Analysis Process

- Transform data
 - Clean up
 - Find anomalies
- Find trends and patterns in the data
- Extract features
- Build models which capture the trends
- Make predictions on new data



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- Data – images of flowers from google, output is a label of the flower species
- Clean up that data – we want real images, we just want flowers in our pictures!
- Find trends – what are characteristics of flowers?
 - Species
 - Number of petals
 - Petal shape and size
 - Colour
 - Leaf shape and size
- Build a machine learning model which learns the traits of flowers
- Pass in new pictures and give a label of what flower is in the picture

Relevant Characteristics of Pet Lovers?

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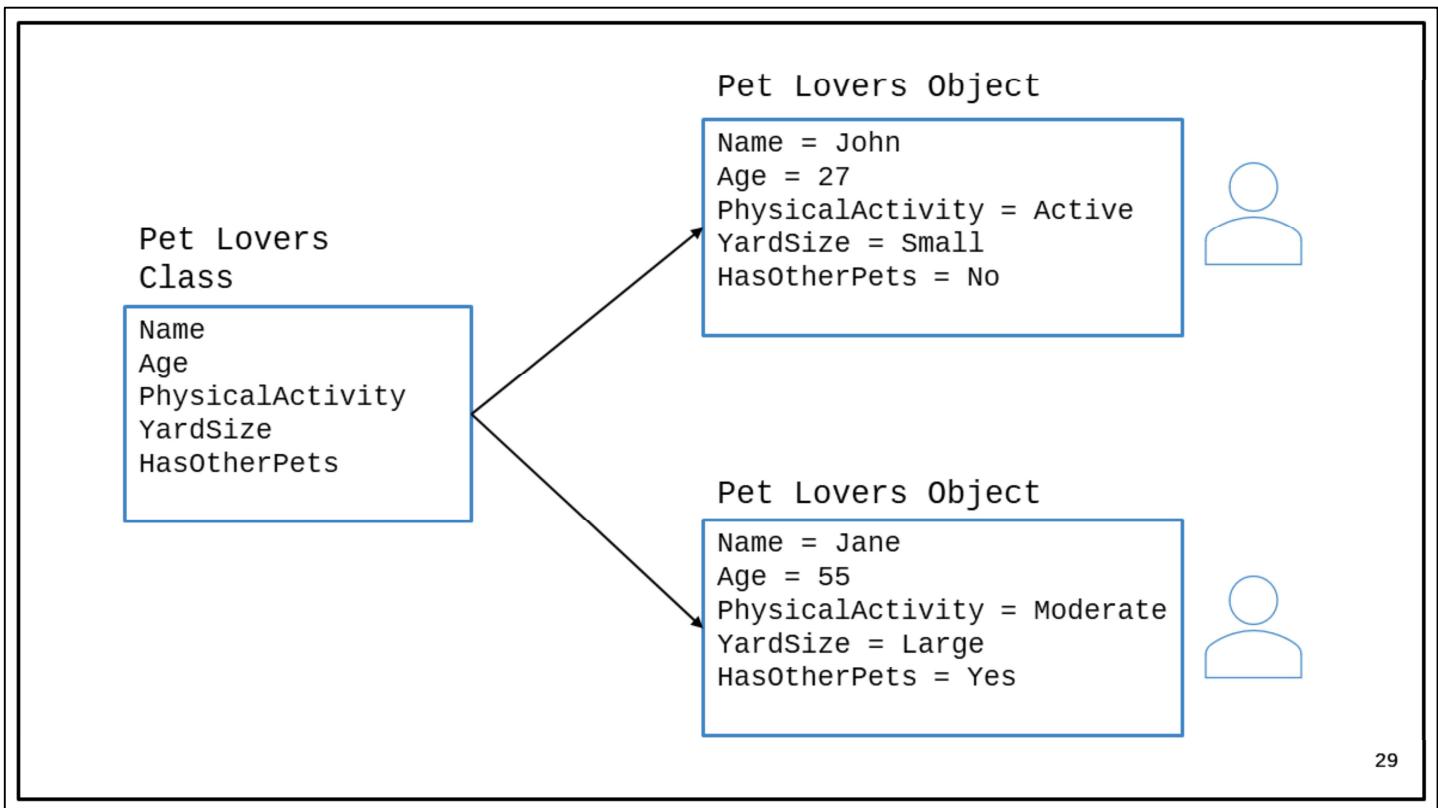
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Exercise: What are some *relevant* characteristics of pet lovers?

Relevant: considering the pet adoption site we're building (including recommendations)

Examples:

- Name
- Age
- Amount of physical activity
- Size of yard
- Have other pets?



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- Go through example
- Classes are abstraction of real-world concepts...class is a tool to model real world concepts

Recommending Pets for John

- Age & physical activity indicate that active breeds of dogs (like Labradors) may be suitable
- But John has a small yard so maybe he needs a smaller active dog like a Border Collie or even a Jack Russel



```
Name = John  
Age = 27  
PhysicalActivity = Active  
YardSize = Small  
HasOtherPets = No
```

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- Have a database of potential adopters and their characteristics
- Have a database of pet traits
- Predicting how to make matches! Like tinder for pets <3

**Questions?
Questions!**