



ROS106

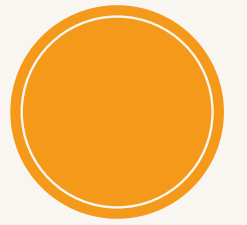
LECTURE 1

(INTRO TO ROS)

By Robotics Club IITD

2027 May 19

Why you Should Attend ?



- Industry Level Skills
- Working on robot simulation
- You have free time in this break (you can use it to learn something)

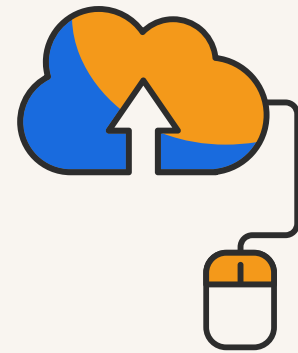


LOGISTICS



Take Home

We have assignments after every session from 2nd session onwards (well we don't want it to be boring like a course so we will take care of that).



Information

Everything on Robotics community.
Website + Github for this
Ask doubts from hostel seniors (They hold POR for a reason)



Pre Requisite

Some basic python skills and ofcourse a will to learn.

So lets start



What is ROS ?

ROS, short for Robot Operating System, is a flexible open-source framework that provides tools and libraries for developers to build and deploy robotics applications. While not a true operating system, ROS offers functionalities like hardware abstraction, low-level device control, and message-passing between different processes within a robotic system.



Well i know you yawned while listening to this(me too while making this ppt, so lets understand it with an analogy)



A Group Assignment

So Imagine you want to complete an assignment in a group(say random). Now consider two scenarios.





- A single Person start with something
- Everything Disorganised
- He/She tells you to carry on you start again
- You 'reinvent the wheel'
- You cuss him/her

- You have certain rules and framework(We call that a friend jisko Depc krni)
- Everyhting is done in a way
- You dont need to start over again

Well this framework is **ROS**

You do everything on your
own ? (DO YOU !!!!)



**We have some tools(our very ownChatgpt) ,
in ROS these are PACKAGES**

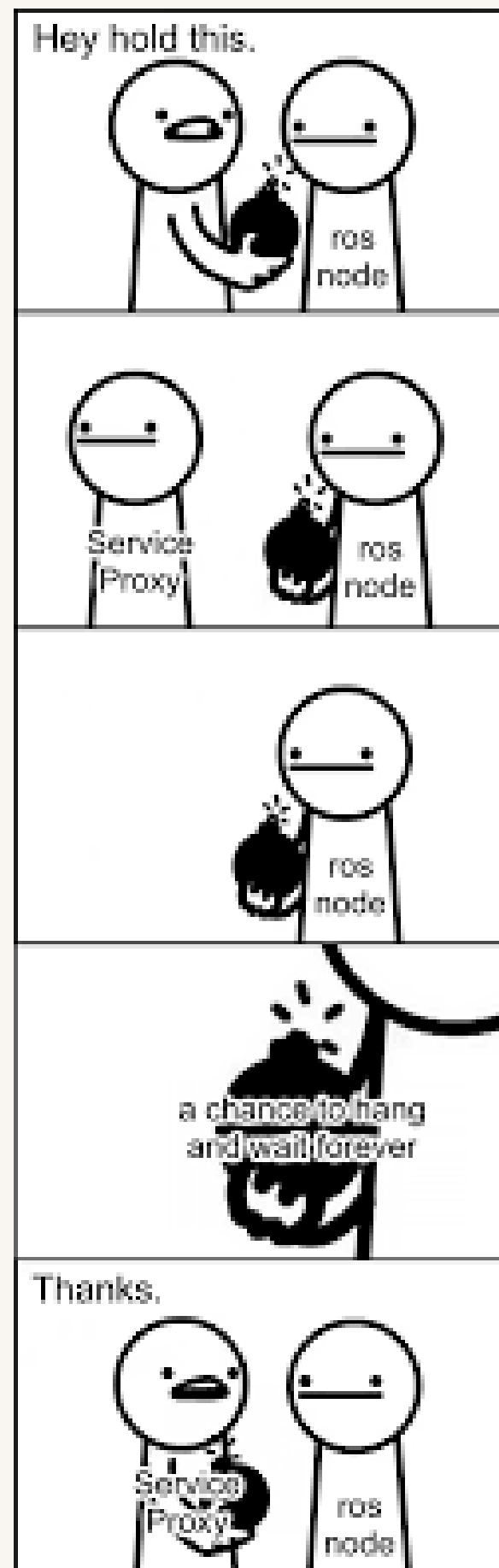
Now you need a way to
communicate



**Of course you are not going to every group
members room(in some cases you even
can't)**

**So you make a group/channel for particular
communication(whatsapp)**

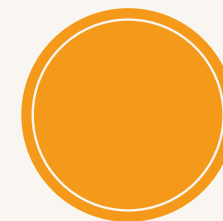
This in ROS is `topic(/topic)`



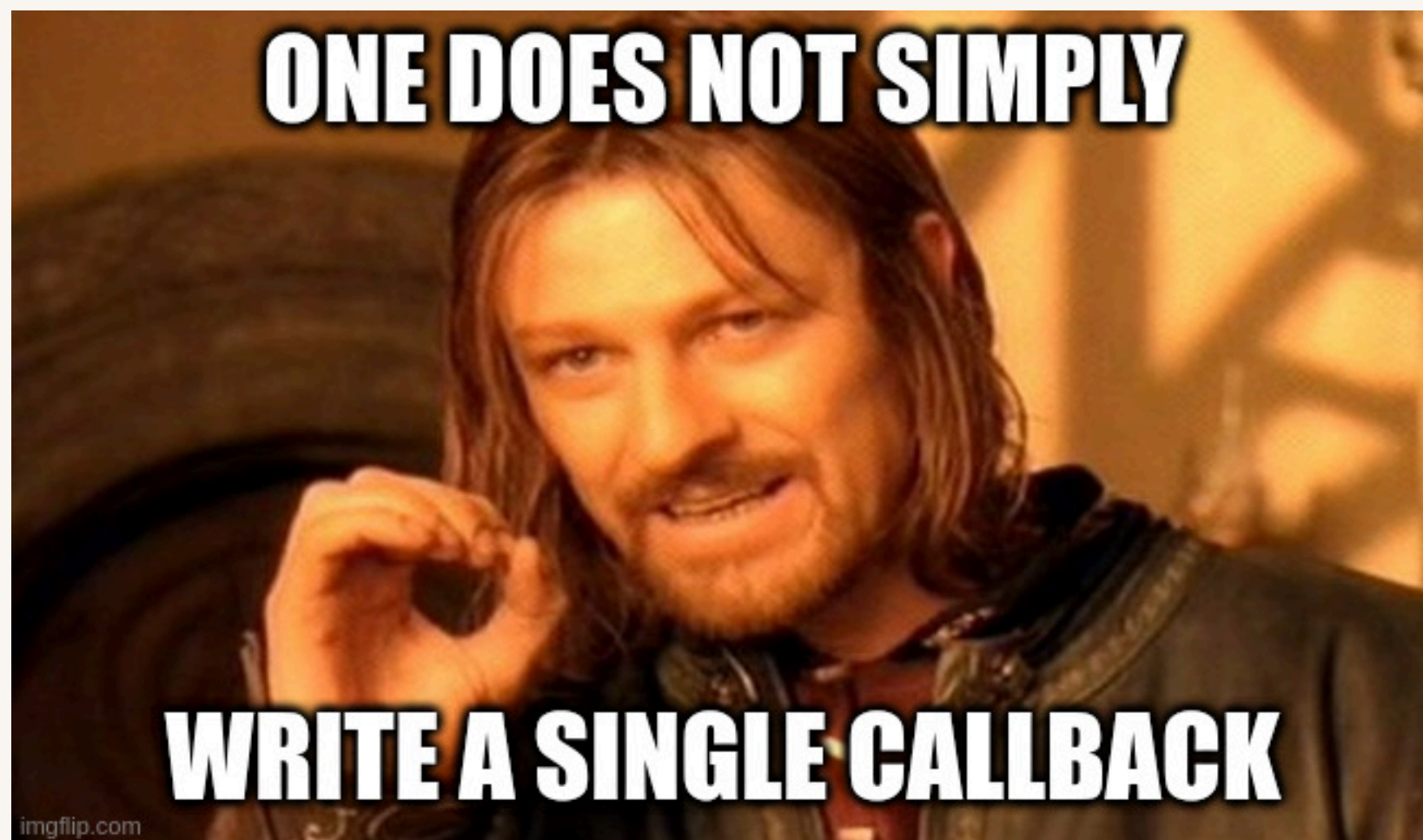
Well you may need some things urgently

You call your friends
In ROS this is called a **service**

Service may not respond



To fix we have action-
servers



Will cover in detail in next lecture
(of course topic , **not meme context**)

Assignment Deadline

(A trigger)



Just like a deadline makes you finish up the work(rather start)

We need something to startup everything on robot
These are **launch files**

Community (Asking seniors for help)



We also have a **ROS community** and **Resources**

Resources - **ROS Documentation** (Of course we don't have an organized **Yash Agarwal drive** everywhere)

Community - Ros discourse (**discourse.ros.org**)

Do we always need ROS ?

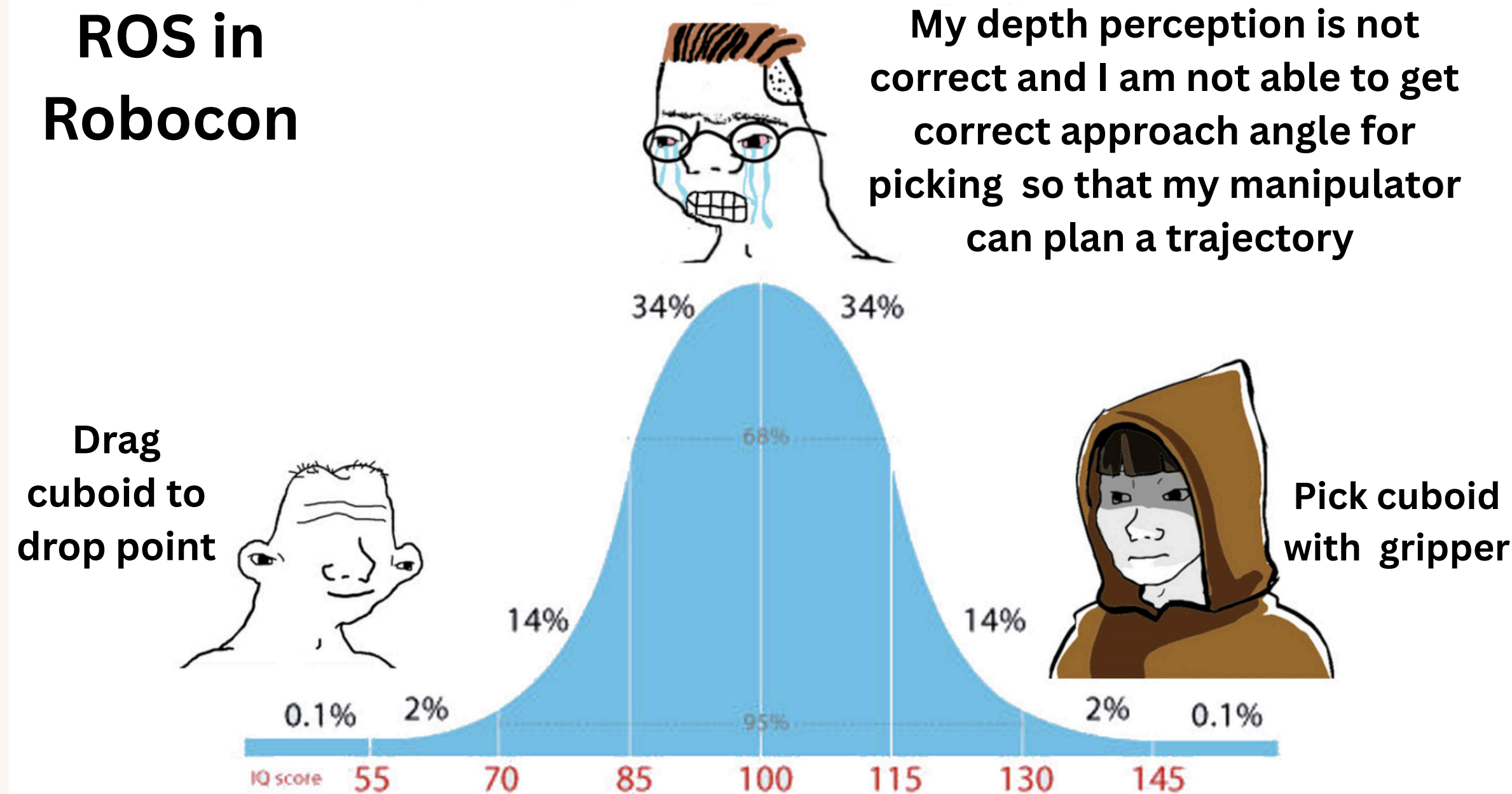


Well it may be an **overkill**

Imagine assigning an essay of 100 words to a group

You dont need ros for building an **obstacle avoiding robot**(did u use ros in workshop ?)

ROS in Robocon





There are two versions of ROS. Both have same fundamentals though many differences in terms of other things

We need to replace some group members

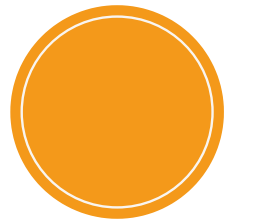


So ROS was replaced by ROS2(many great features)

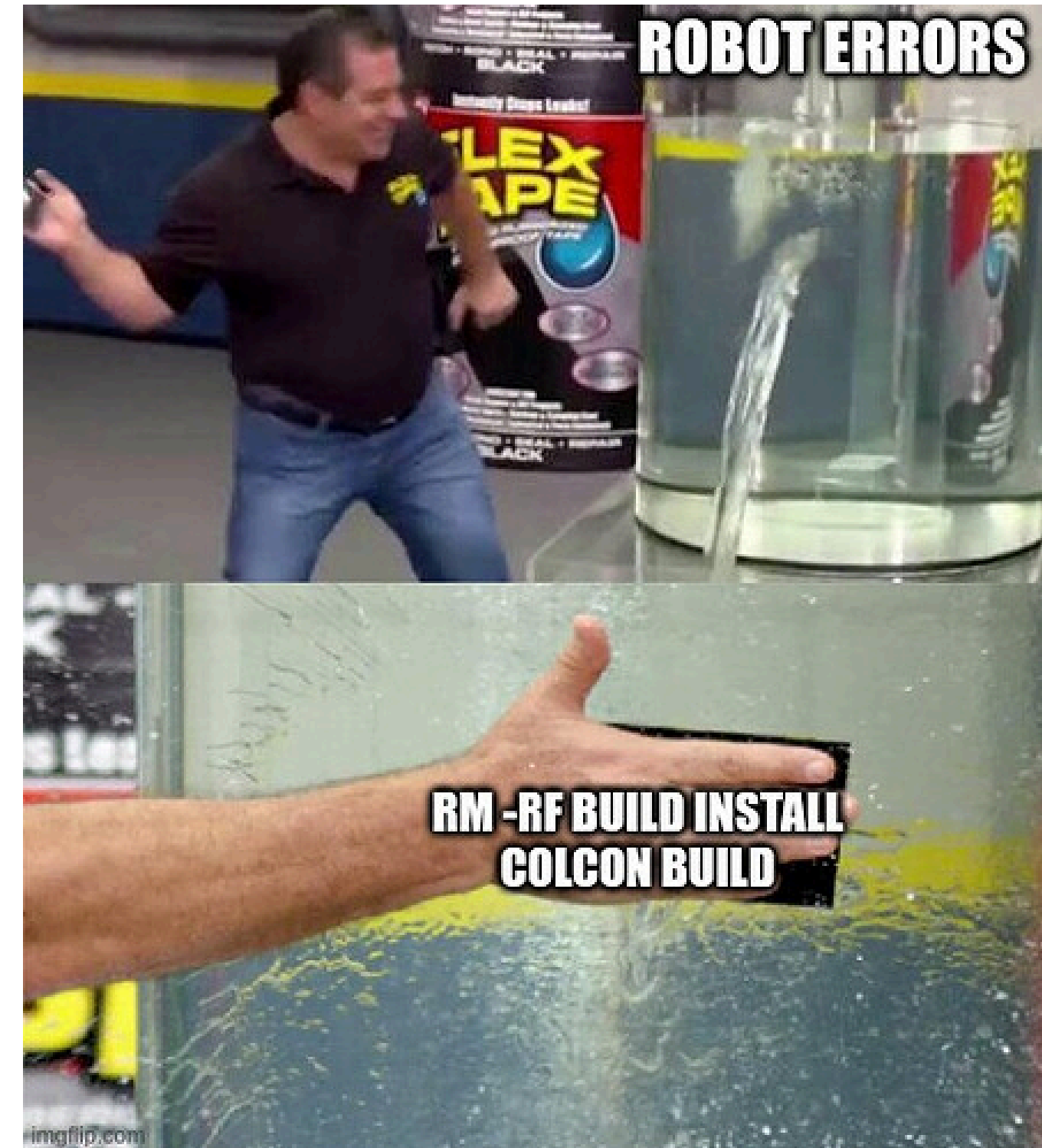
We will avoid using ROS1 in ROS106 beacuse most of ROS1 packages are out of support now



Build System (Colcon Build)



- We have many packages
- We need some dependencies for each
- So colcon build does this job for us





Time for practical Demos

Caution- We will be using theconstruct.ai throughout the course You dont need to have install ROS2 on ubuntu machine if you have its good but dont think it will limit you if you dont have



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The End

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