1 Tank Drive

1.1 Cost

- Needs only 2 gearboxes. (4 if designed for mecanum) (upgraded if 6 motors used)
- Motors used is up to the year, with options for 2 or 4. (or 6 with upgraded gearboxes)
- Wheels used is 6. (or 4 if designed for meccanum)
- Can use any size of wheel if chains are used. Can use 6"+ if belts are used.
- Can use any type of wheel. (2 normal and 2 omni used for rotational axis change)
- Can use chain or belts with sprockets or pullies respectively.

1.2 Programming

- Can be done by freshmen with some help.
- Extremely straightforeward.
- Short development time.
- Easiest to program for autonomous. Dead reckoning or encoder reading possible.
- No need for a relative heading from a gyro.

1.3 Capabilities

- Tied for best design for pushing in the direction of the wheels.
- Resists perpendicular pushing perfectly.
- Resists $Sin(|\Theta|)$ in general where Θ is the angle of the pushing force from perpendicular.
- Can rotate about anywhere on the axis of the center wheels.
- Single best option for traction reliability. (track optional to help traction if needed)
- One of the best options for max speed/acceleration as all motors are alligned.
- More compact and leaves more space for interior components.

1.4 Hinderances

- Must rotate to move in another direction.

1.5 Driver Usage

- Easiest to learn.
- No orientation required, no gyro/accelerometer drift.
- Easy to build and most likely part of a practive bot so easy to practice on.
- Easiest control scheme, only needs 2 axis to control on seperate hands leading to less human error.
- More likely to have experienced drivers.

1.6 Design and Build

- Easiest to design.
- Easiest to build.

1.7 Assembly and Repair

- Easiest to assemble if designed well.
- Easy but annoying to repair with chain and sprockets.
- Either easy or very hard to repair with belts. (spares required)

2 Mecanum Drive

2.1 Cost

- Needs 4 gearboxes.
- Motors used is 4.
- Wheels used is 4.
- Can use any size of mecanum wheel if chains are used.

- Needs a full matching set to function, with 2 of each chirality.
- Can use chain or belts with sprockets or pullies respectively.

2.2 Programming

- Can be done by freshmen with a some help to a lot of help.
- Programming requires knowlege of how wheels are oriented.
- Medium development time.
- Hardest to program for autonomous. Dead reckoning isn't even a guarantee.
- Can do without a gyro, but one is often used and is the source of problems.

2.3 Capabilities

- Not great for pushing in the direction of the wheels, but it can do it.
- Resists roughly half of all pushing in any direction.
- Rotations possible, but not reliable due to rollers.
- Some conditional traction reliability.
- Ideal for very small perpendicular to wheel motions.
- More compact and leaves more space for interior components.

2.4 Hinderances

- Easy for most robots to push around.
- Hard to operate on uneven or slick terrain, with potential to get stuck.
- Wheels are prone to heavy wear and tear and flat spots causing sliding or skipping.

2.5 Driver Usage

- Easy to learn. Very hard to master.
- Possible orientation corrections based on presence of gyro/accelerometer and its drift.
- Relatively easy to build but there may or may not be a practice bot ready.
- Harder control scheme, often uses at least 3 axis on the same joystick where human error is likely.
- Moderately likely to have somewhat experienced drivers, but very unlikely to have mastery.

2.6 Design and Build

- Relatively simple to design.
- Needs space for extra gearboxes and power transmission.
- Easy to build.

2.7 Assembly and Repair

- Easy to assemble but requires thought of wheel orientations.
- Somewhat harder to repair.
- Full set of spares required at all times.