

Top Level

F1 Transform electrical energy to mechanical energy

C1a DC motor

Sub-Functions (C1a)

sF1 Transfer energy from motor to wheels

sC1a Direct drive

sC1b Gear box

sC1c Belt drive

sC1d Chain drive

sC1e Friction drive

sC1f Fan or propellor

C1b Explosives

sF1 Move explosives behind center of mass

sC1a Chute of gunpowder with a servo

sC1b Gravity fed tube

sC1c Small fan

sF2 Set Off Explosives

sC2a Lighter

sC2b Primer with pins

sC2c Arcing electricity

C1c Jet Engine

sF1 Hold Fuel

sC1a Internal gas tank

sC1b External gas tank

sF2 Move fuel to engine

sC2a Gravity

sC2b Injection

sC2c Difference in air pressure

sF3 Expel fuel

sC3a Fan or propellor

sC3b Air compressor

sF4 Light fuel

sC4a Pilot light

sC4b Arcing electricity

F2 Detect turns

C2a Potentiometer

sF1 Detect resistance changes

sC1a Arduino

C2b Accelerometer/gyrometer

sF1 Detect changes in acceleration/gyration

sC1a Arduino

C2c Light sensor

sF1 Detect differences in light reflected from track

sC1a Arduino

C2d Preset time intervals

sF1 Wait for preset time interval

sC1a Arduino

C2e None

sF1 Go slow enough to not need turn detection

F3 Turn relative to ground

C3a Conical wheels

sF1 Adjust speed for each wheel to account for difference in distance travelled

sC1a Geometry will account

C3b Flat wheels

sF1 Allow for slip

sC1a Use material with low coefficient of friction

C3c Slip differential

F4 Move up steep inclines

C4a High momentum

sF1 Quickly accelerate

sC1a Lightweight chassis

sC1b Gear ratio

C4b High torque

sF1 Increased amounts of friction

sC1a Rubberized wheels

sC1b Adhesive

sF2 Sustain torque

sC2a Gear ratio

sC2b Multiple motors

C4c Sticky arms

sF1 Move along its length

sC1a Ratchet

sC1b Pulley and motor powered

sF2 Launch arms forward

sC2a Crossbow

sC2b Pneumatics

sC2c Explosives

sC2d Slingshot

sC2e Catapult

F5 Control speed

C5a Drum brake

sF1 Apply pressure to wheels

sC1a Servo

sC1b Hydraulics

sC1c Pneumatics

C5b Spike

sF1 Force spike into ground

sC1a Servo motor

sC1b Heavy spike with release latch

sC1c Shoot spike into ground

sC1d Hydraulics

sC1e Pneumatics

C5c Disk brakes

sF1 Apply pressure to wheels

sC1a Servo

sC1b Hydraulics

sC1c Pneumatics

sC1d Electromagnets

C5d Drag based brakes

sF1 Increase drag coefficient

sC1a Flip panels outward

sC1b Parachute

C5e Electric brake system

sF1 Transform kinetic energy of motor to electrical/heat energy

sC1a Connect motor to storage battery/capacitor (regen braking)

sC1b Connect motor to resistor (dynamic braking)

sC1c Connect motor to power source in reverse (plug braking)

F6 Stay aligned with rails

C6a Conical wheels

C6b Wheels with o-rings and flanges

C6c Tank treads

F7 Contain components

C7a Sit in box

C7b Drill to plate

C7c Adhere to plate

C7d Potting

C7e Welding

F8 Connect to cargo carts

C8a Screws

C8b Rope/wire

C8c Links

C8d Pins

C8e Glue