NAME MT-14 COURSE ENGR 4020

LESSON Functions + Mechanical Design 1 DATE

PAGE 1 of 2

Functions

In programming, functions are used to execute commands that will be repeated

↳ good candidates for you:
turn commands,
forward, reverse, etc.

return type function name (variable type, variable type ...)
↑ arguments

EX:
```
DigitalOut LED(D2);
void blink(void);

int main{
    blink;
}

void blink(void){
    LED = !LED;
    wait(0.2);
}
```

- we can put functions either in our main code or in a separate file

EX:
main.cpp
movement.cpp
movement.h

- Every additional file we want for main needs a header (.h) file
  → header file contains functional prototypes
  → function file contains definitions of pins, functions

- You should use functions to organize your robot code

Mechanical Design 1

- common design issues
  ① Limited vertical travel makes gravity difficult to use as a motive force
  ↳ need mechanisms or motors
  ② objects can jam, especially if you rely on gravity alone to feed them to sorter/delivery

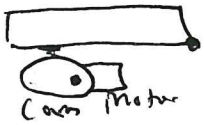
- In this course we will focus on Mechanical design axioms
  ↳ I will provide helpful hints as we go

- An axiom is a statement widely accepted as true

Axiom 1 Cams provide desirable actuation qualities over connecting directly to motor shaft

EX:

can rotate but requires a lot of torque

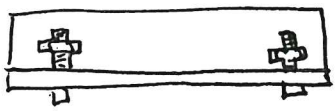


tips enough without as much torque

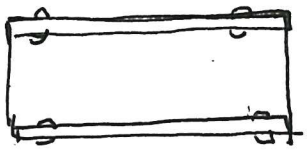
↳ acts more reliably.

Axiom 2

T-slotted bolts take up less space and are out of the way of object motion



vs



Axiom 3 It is easier to change a program than it is to change hardware

↳ if your mechanical design is complete and can produce desired results, you may want to try changing algorithm first.

EX: dumper bin doesn't get all objects with force of gravity

↳ algorithmic options
- Forward/reverse
- shimmy → - rotate actuator again

Next time – more fundamentals then more axioms with examples