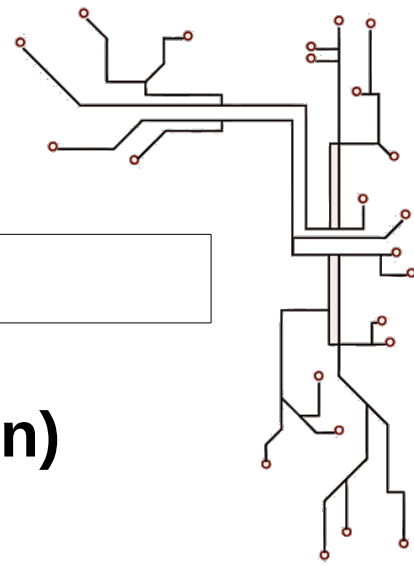


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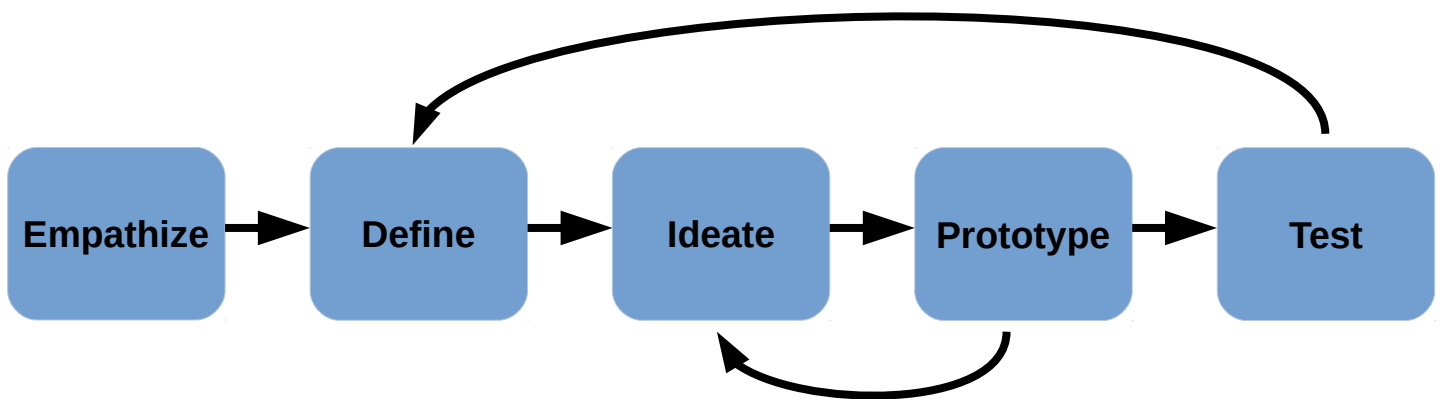
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Lesson 8 (Ideating a Solution)

Slides – <https://a9i.sg/huayi>

mBlock – <https://ide.mblock.cc> (start mLink too!)

Design Thinking



5 Phases of Design Thinking

Ideate (Brainstorm Creative Solution)

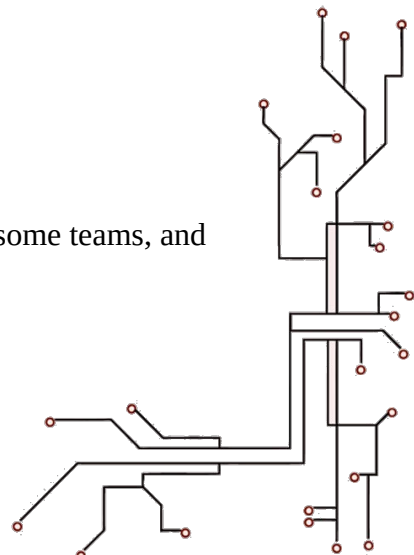
- Start with good problem statement from a relevant Point of View
- Think of How We Might...?
- Work with your team to come up with a creative answer

Keep In Mind

- No Stupid Questions
- No Silly Answers
- Quantity First, Pear Down Later
- Respect Others, Listen First - Then Talk

3 Common Ideation Techniques

- Brainstorm
- Worst Idea Possible
- Storyboarding
- Choose one, or try a mix...
There's no wrong way to ideate, but some approaches work better for some teams, and others work better for other teams
- This is your time to be silly with thought experiments

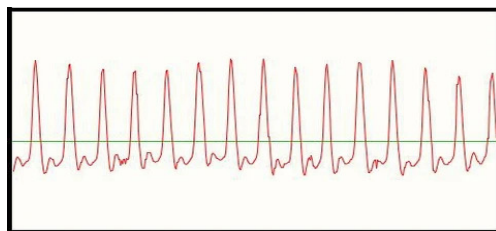
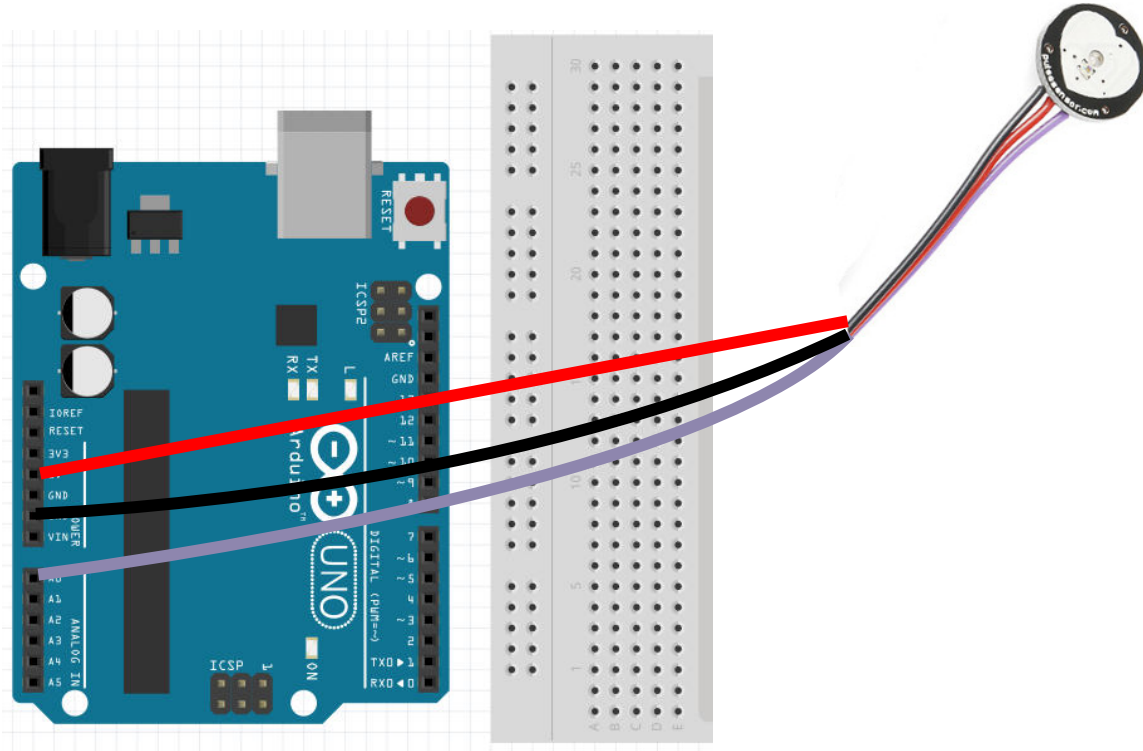


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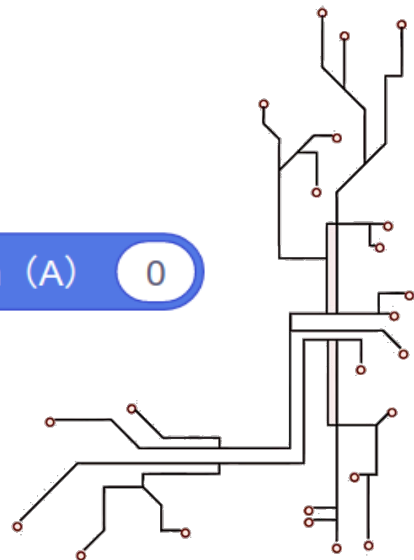
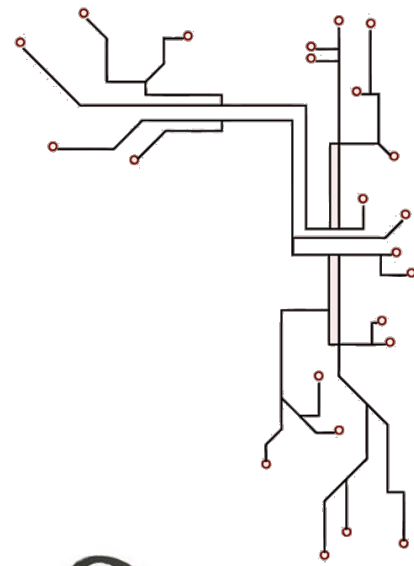
Heart Sensor

- Signal: Analog Voltage
- Heartbeat Threshold ~512 (midpoint)



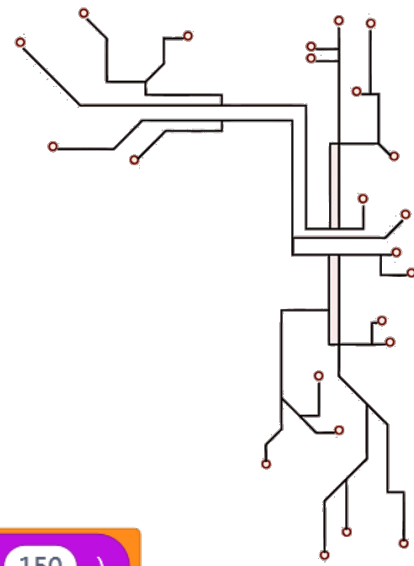
Sesnor	Arduino
Red (+)	5V
Purple (S)	A0-A5
Black (-)	Gnd

∞ read analog pin (A) 0



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Heart Monitor

On Arduino Device

```
when clicked
  forever
    set sensor to read analog pin ( A ) 0
    set heart to map sensor from ( 200 , 1023 ) to ( -150 , 150 )
```

On Any Sprite

```
when clicked
  go to x: -240 y: 0
  define Pen Reset
  pen up
  erase all
  pen down
  forever
    change x by 1
    set y to heart
    if x position > 235 then
      set x to -240
      Pen Reset
```

Challenge

- **Count beats**
When sensor passes threshold
- **No double-counting**
Before you can count another beat, you have to wait for the first to finish
Hint: Remember how we waited for Ultrasonic Sensor to count a full push-up...
- Use **Timer** to keep track of time
- On every beat calculate:
BPM = # of beats / time-in-seconds * 60

Activity

Record your resting Heart Rate in Beats Per Minute

_____ BPM

Do 60 jumping jacks... Record your Heart Rate again

_____ BPM

