



Solar Panel Cubic Charger

OMG Studio
ENSC 440/305 Project
SFU Engineering Science
Dec 14, 2011

CEO – Michael Chen

- Majors in Electronics Engineering
- Third Year
- Group Leader
- Directions
- Programming

CFO – Shuyang Hou

- Majors in Electronics Engineering
- Third Year
- Testing
- Questioning
- Alternatives

VPM – Yu Bu

- Majors in System Engineering
- Fourth Year
- Research
- Marketing



VPO – Chris Chen

- Majors in Electronics Engineering
- Third Year
- Graphic Design
- Programming
- Hardware



Outline

- Motivation
- System Overview
- High Level System Design
- Business Case
- Project Specifics
- Experience
- Conclusion
- Acknowledgements
- Questions





Motivation

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How we came up with this idea

Motivation

- Market Value
- Convenience
- Green
- Achievable



Motivation

Market Value

- Student
- Fashion
- Small
- More Efficient



Motivation

Convenient

- Easy to Carry
- Solar Energy



Motivation

Green

- Environmental Friendly



Motivation

Achievable

- 300-Level Courses
- Time Limits
- Budget





System Overview

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What does Solar Panel Cubic Charger do

System Overview

- Charges Cell Phones
- Battery Level Indicator
 - Bi-Color Built-in Battery Level Indicator
 - Red-Color Solar Power Indicator
- Button/ Switch
 - Power Source Button
 - Parallel / Series mode

System Overview

Charging

- Variety
- Portable
- Efficient

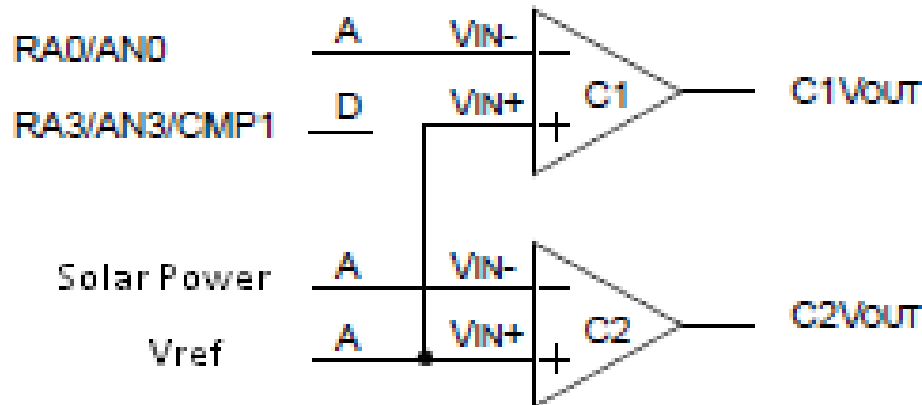


System Overview

Battery Indicators

- Bi-Color LED
 - Green – good working condition
 - Red – need to be charged
- Solar Panel Power Indicator
 - Red – If the light source is not enough to charge the built-in battery

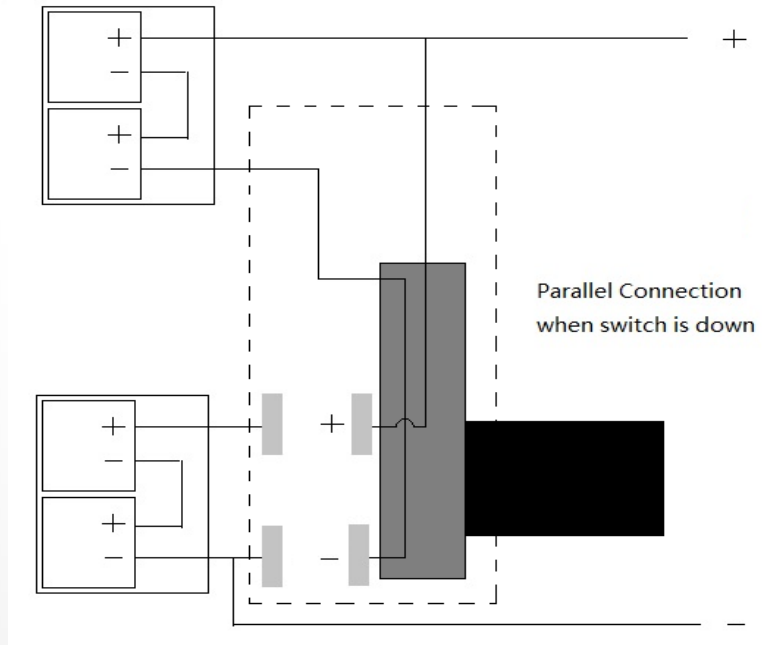
Two Common Reference Comparators



System Overview

Button / Switch

- Power Source ON/OFF Button
- Switch between Parallel / Series Modes
 - Parallel – enough of light source
 - Series – not enough of light source



System Overview

Micro-Controller

- Brain of the System
- Controls LEDs
- Thermal Sensor



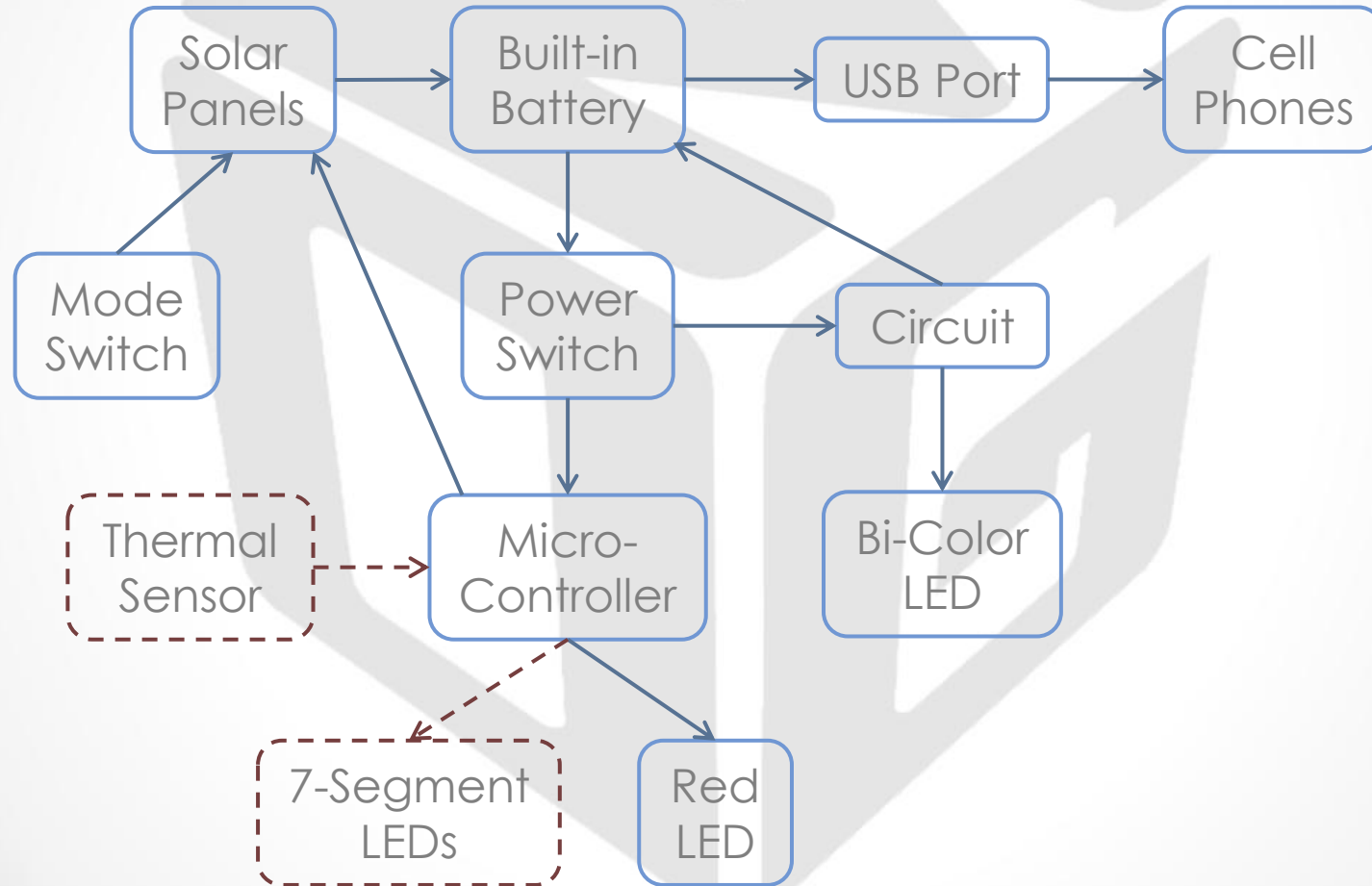


High Level System Design

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How does it work

High Level System Design





Business Case

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Market Value of Solar Panel Cubic Charger

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Business Case

- Market
- Cost
- Competition



Business Case

Market

- Students
- Hang on the Bag Pack
- Outstanding Looking



Business Case

Cost

- Solar Panels - \$24
- Micro-Controller - \$5
- Red LED - \$0.5
- Bi-Color LED - \$0
- Socket - \$0.25
- Circuit Board - \$0
- Push-to-Make Switch - \$0.6
- Mode Switch - \$0.5
- 7-Segment LED - \$2.8
- Built-in Battery - \$0
- Resistors, Capacitors, Inductors - \$0
- Zener Diode - \$0.4
- Crystal - \$1.5
- Thermal Sensor - \$5.2
- Casing - \$6
- Paint - \$6.43
- Female USB Port - \$0
- Labour - \$0
- **Total - \$53.18**

Business Case

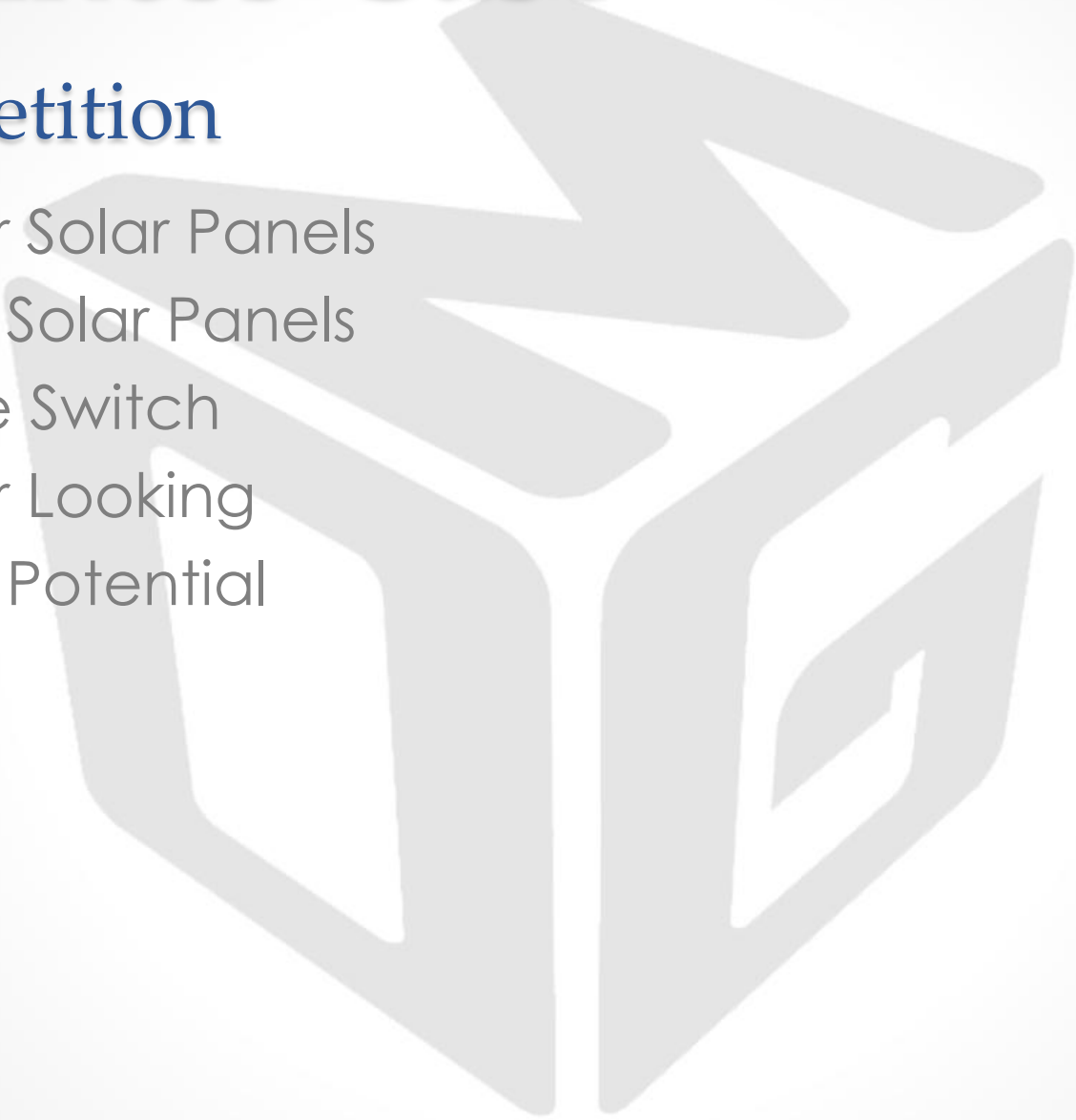
Cost

- Solar Panels - \$24 - \$4
- Micro-Controller - \$5 - \$1
- Red LED - \$0.5 - \$0.1
- Bi-Color LED - \$0 - \$0.1
- Socket - \$0.25 - \$0.1
- Circuit Board - \$0 - \$0.1
- Push-to-Make Switch - \$0.6 - \$0.1
- Mode Switch - \$0.5 - \$0.1
- 7-Segment LED - \$2.8 - \$0.2
- Built-in Battery - \$0 - \$1
- Resistors, Capacitors, Inductors - \$0 - \$0.1
- Zener Diode - \$0.4 - \$ 0.1
- Crystal - \$1.5 - \$0.1
- Thermal Sensor - \$5.2 - \$0.1
- Casing - \$6 - \$1
- Paint - \$6.43 - \$1
- Female USB Port - \$0 - \$0.1
- Labour - \$0 - \$1.5/hour
- **Total - \$53.18 - \$10.9**

Business Case

Competition

- Better Solar Panels
- More Solar Panels
- Mode Switch
- Better Looking
- More Potential





Project Specifics

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How did we manage this project

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Project Specifics

- Timeline
- Budget
- Teamwork



Project Specifics

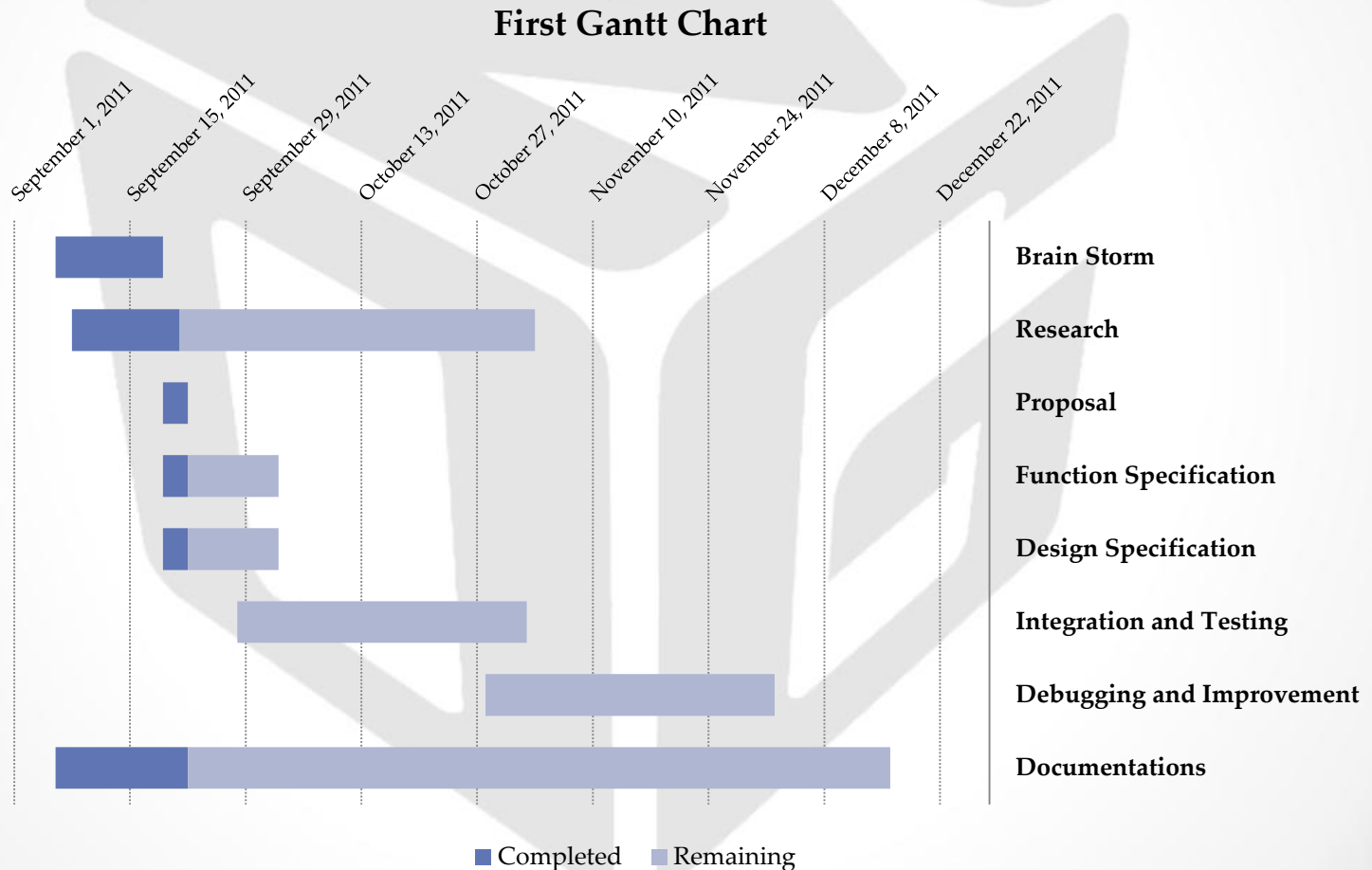
Timeline

- Mostly on Schedule
- Design Specification



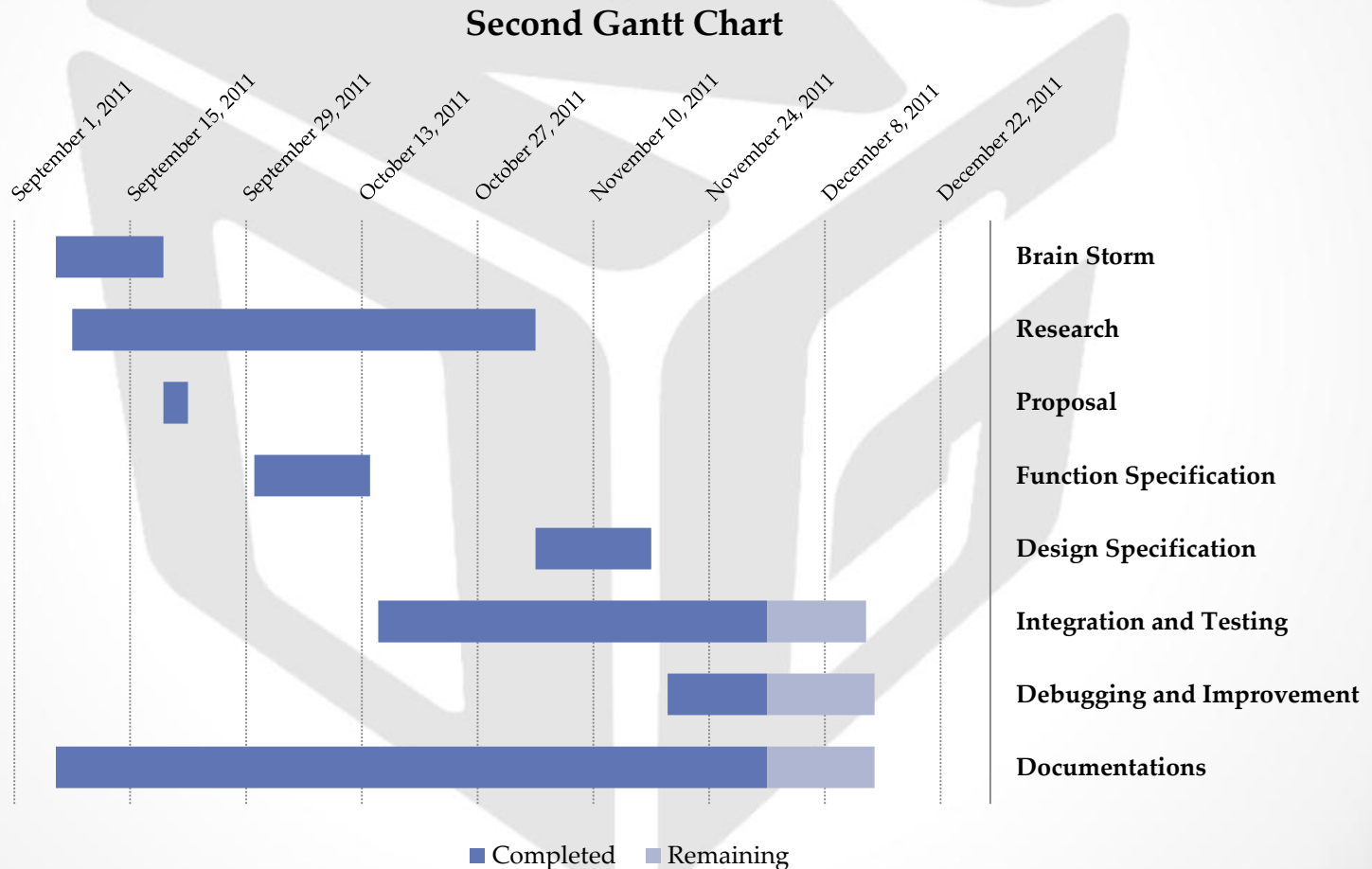
Project Specifics

Timeline



Project Specifics

Timeline



Project Specifics

Budget

Unexpected

- Thermal Sensor
- Micro-Controller
- 7-Segment LED
- Push-to-Make Switch
- Diodes

Savers

- Built-in Battery
- Female USB Port
- Resistors

Project Specifics

Teamwork

- No Fighting
- Good Tempers
- Discussion
- Suggestion
- No Dictators
- 3 EEs & 1 System





Experience

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What did we learn

Experience

- Time Management
- Outside Class
- Un-Expectations
- Plans vs. Realities
- Work as a Team



Experience

Time Management

- Plan Well
- Plan Ahead



Experience

Outside Class

- So Much More Outside Class



Experience

Un-Expectations

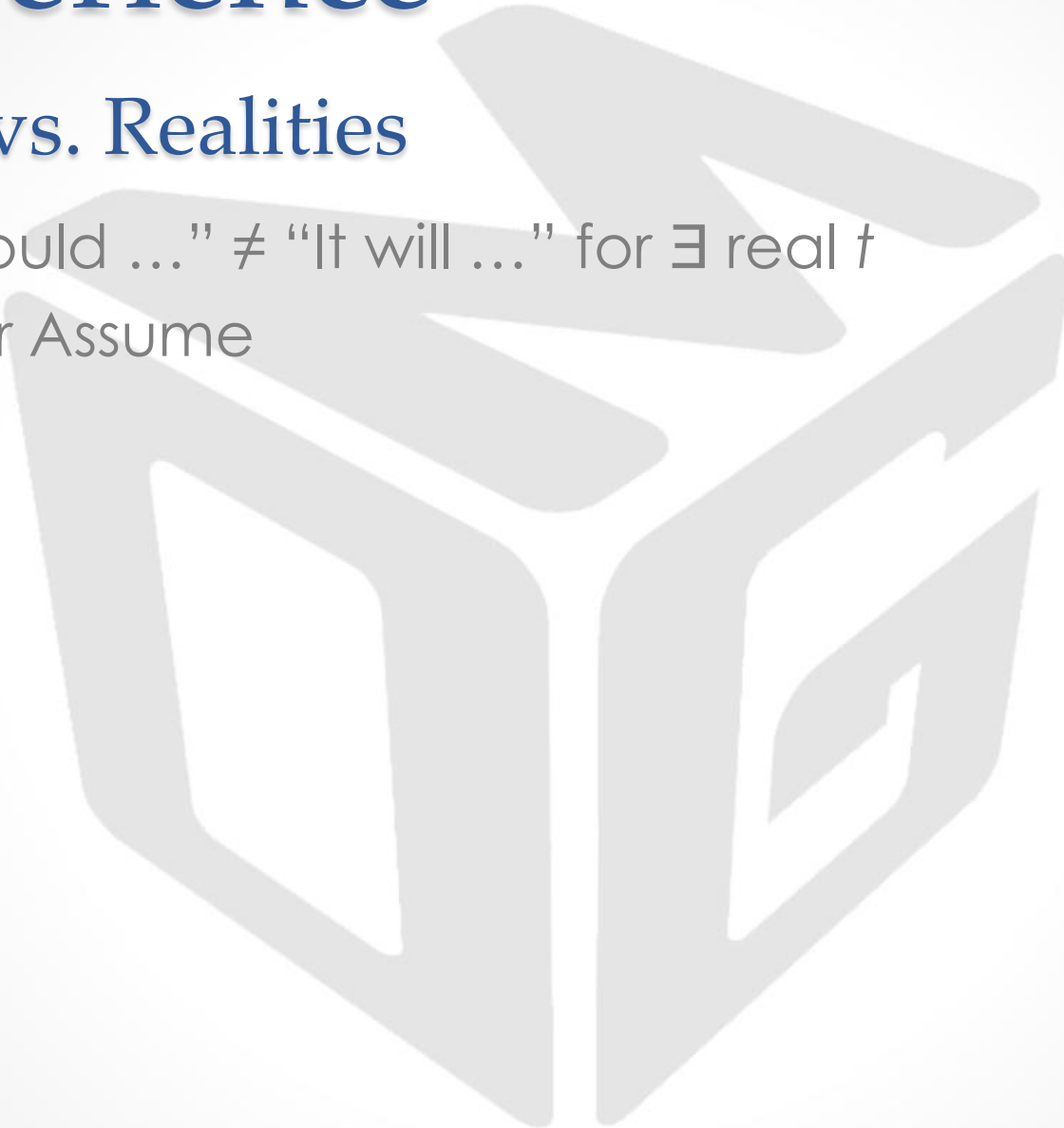
- Plan B
- Solve it Fast
 - New programming for Micro-Controller
 - Components drain current from solar panels



Experience

Plans vs. Realities

- “It should ...” \neq “It will ...” for \exists real t
- Never Assume



Experience

Work as a Team

- Care about Others
- Be Prepared
- Try Hard





Conclusion

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For this presentation

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Conclusion

- Rich Experience
- Friendly Team
- Plan!!
- Future Development





Acknowledgement

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Thanks!!

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Acknowledgements

- Jamal Bahari
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Questions

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Please!!