PRESENTATION

FOLLOW ALONG WITH YOUR WORKBOOKS

WELCOME BOY SCOUTS

- Grace Covenant Troop 777
- Robotics Merit Badge
- Alan Burdick

Session III
DESIGN, BUILD, & TEST

REQUIREMENT 4

- 4. DESIGN, BUILD, AND TEST. Do each of the following
  a. Chose a task for the robot or robotic subsystem that you plan to build. Include sensor feedback and programming in the task. Document this information in your robot engineering notebook.

  b. Design your robot. The design should use sensors and programming and have at least 2 degrees of freedom. Document the design in your robot engineering notebook using drawings and a written description.

  c. Build a robot or robotic system of your original design to accomplish the task you choose for requirement 4a.

REQUIREMENT 4

- 4. DESIGN, BUILD, AND TEST. Do each of the following

  e. Test your robot and record results in your robot engineering notebook. Include suggestions on how you could improve your robot, as well as pictures or sketches of your finished product.

REQUIREMENT 4

- 4. DESIGN, BUILD, AND TEST. Do each of the following

  d. Discuss the programming options available for your robot_____

  _____

  Then do option 1 OR option 2

  1. Option 1. Program your robot to perform the task you choose for your robot in 4a. Include a sample of your programs source code in your robot engineering notebook.
  2. Option 2. Prepare a flowchart of the desired steps to program your robot for accomplishing the task in 4a. Include procedures that show activities based on sensor inputs. Place this in your engineering notebook.

Robot design/build

- Divide into two teams
- Choose a function for your robot
- Select the sensors you will use
- Draw out your ideas in a notebook and share with your team.
- Build and program your robot

Design

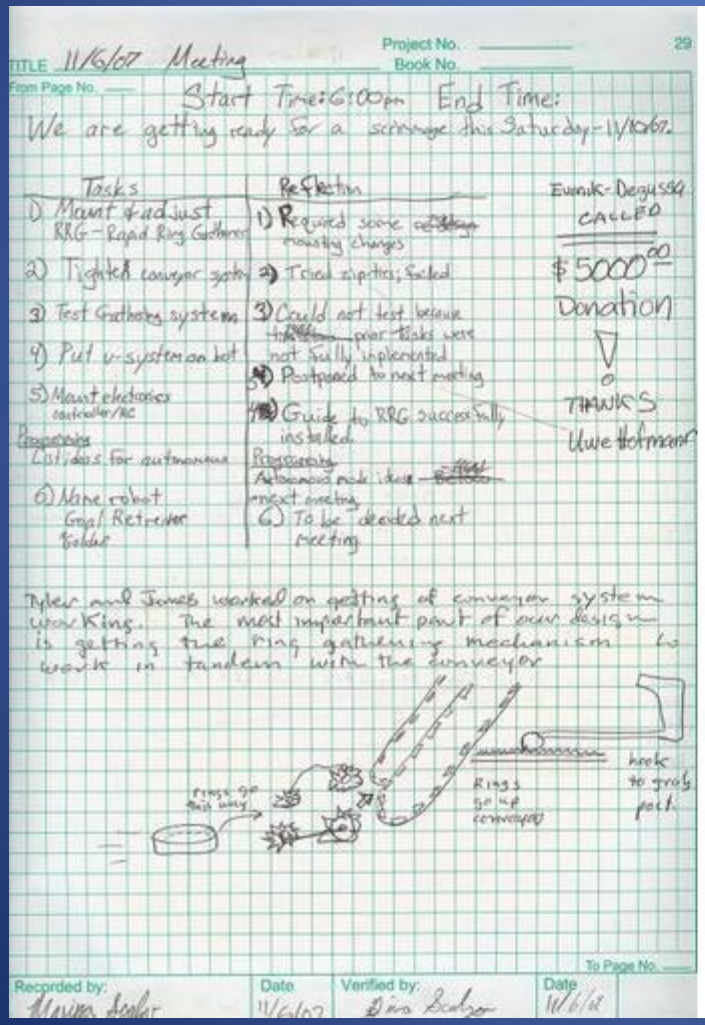
- Break into two teams
- Choose a task or function for your robot
  - Sumo robot
  - Rescue robot
  - Basketball robot
  - Butler
  - Greeter
  - Launch platform
- Include sensor feedback & programming

Design

- Identify the problem
- Understand the problem and constraints
- Analyze the problem
- Evaluate and brainstorm the problem
- Select the approach to build
- Communicate design to counselor

Engineering notebook

(notebook is required)



TITLE 11/6/07 Meeting — Project No. — Book No. — 29

From Page No.

Start Time: 6:00pm End Time:

We are getting ready for a scrimmage this Saturday - 11/10/07.

Tasks	Reflection
1) Mount & adjust RRG - Rapid Ring Gathers	1) Required score ~~adjusting~~ making changes
2) Tighted conveyor system	2) Tched zip ties; tighted
3) Test Gathering systems	3) Could not test because ~~the~~ gear flaks were not fully implemented
4) Put v-system on bot	4) Postponed to next meeting
5) Mount electronics controller/RC	5) Guide to RRG successfully installed
Programing	Programing
List ideas for autonomous	Autonomous mode ideas ~~for~~ next meeting
6) Make robot Goal Retriever Holder	6) To be decided next meeting

Evonik-Degussa CALLED

$5000.00 Donation

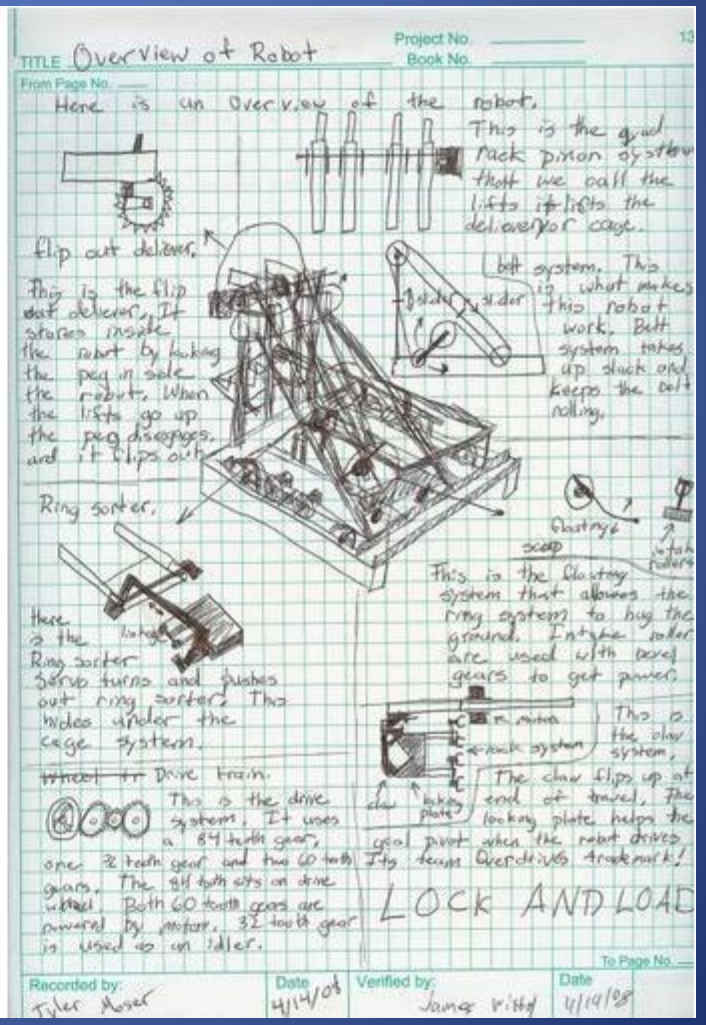
THANKS

Uwe Hofmann

Tyler and James worked on getting of conveyor system working. The most important part of our design is getting the ring gathering mechanism to work in tandem with the conveyor

To Page No.

Recorded by: Marissa Sadler — Date 11/6/07 — Verified by: Dina Sadler — Date 11/6/07



TITLE Overview of Robot — Project No. — Book No. — 13

From Page No.

Here is an overview of the robot. This is the goal rack pinion system that we call the lifts it lifts the deliverer cage.

flip out deliver.

This is the flip out deliver, It stores inside the robot by locking the peg in side the robot. When the lifts go up the peg disengages, and it flips out

belt system. This is what makes this robot work. Belt system takes up slack and keeps the belt rolling.

Ring sorter.

There is the Ring sorter Servo turns and pushes out ring sorter. This rides under the cage system.

Clutchy scoop

This is the Clutchy system that allows the ring system to hug the ground. Intake rollers are used with towed gears to get power.

~~Wheel for~~ Drive train.

This is the drive system. It uses a 84 tooth gear, one 8 tooth gear and two 60 tooth gears. The 84 tooth sits on drive wheel. Both 60 tooth gears are powered by motors. 32 tooth gear is used as an idler.

claw — locking plate — rack system

This is the claw system.

The claw flips up at end of travel. The locking plate helps the goal pivot when the robot drives. It's team Overdrive's trademark!

LOCK AND LOAD

To Page No.

Recorded by: Tyler Moser — Date 4/14/08 — Verified by: James Pitts — Date 4/14/08

Engineering notebook

- Robot: Describe type of robot of robot you want to build.
- Task: Describe in detail the task the robot will accomplish.
- Several design ideas: Discuss with counselor.
- Tests: Describe the tests and designs that did not work that lead to the final design.
- Pseudo code: Prepare a detailed flowchart of the step-by-step commands the robot must complete to accomplish the task.
- Software code: include code or flowchart you used.
- Code modifications: include any changes you make to the pseudo code or actual code.
- Final Robot Design
- Potential for Improvements

Building the Robot

- The Chassis subsystem
  - Stability
  - Robust design
  - Vulnerability
  - Interaction with other components
- The mechanical subsystem (move chassis and manipulator's)
  - Torque, the circular force of the motor
  - Friction, force between parts that may prevent motion
  - Gravity, the force that holds the robot to the ground
  - Lift, is the force that raises a robot off the ground
  - Buoyancy, the force pushing things to the surface of water
  - Degrees of Motion: describes how many directions an actuator or manipulator can move.

Building the Robot

- The Power subsystem
  - Electricity
  - Batteries
  - Problems with overheating
  - Soldering
- The Controls subsystem
  - Robot controller (the brain)
    - Output, motors, servos, actuators; wheel, flaps, fins, and arms
    - Input, by operator; joy stick, remote control
    - Input, sensors; light, sound, proximity, temperature, bump

Building the Robot

- The Controls subsystem
  - Programming, plain language translated to language
    - Pseudo code: commonly called “flowcharts”
    - High-level language
      - » Text based; (java, C, & C + +)
      - » Graphical language; drag and drop graphic blocks onto screen and connects them with lines indicating flow of program.

Demonstrate

REQUIREMENT 5

- 5. DEMONSTRATE. Do the following:
  a. Demonstrate the robot you built in requirement 4
  b. Share robot engineering notebook. Talk about how your robot accomplished the task, the improvements you would make in your next design, and what you learned about the design process.

    - How well your robot accomplished the task
    - Improvements you would make
    - What you learned

Robotics Parts 4 & 5

- Please complete workbook sections 4 and 5.
- Before starting the next session be sure to put notes and drawings in notebook.
- See counselor for more details.