

POWERCRAFT



An educational tool
that simulates power
transmission

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Research & Exploration

- ❑ Minecraft
 - ❑ Develop using existing mods (electrical age)
- ❑ Terasology
- ❑ Minetest
 - ❑ Mesecons mod
 - ❑ Develop a mod from scratch
- ❑ Review electrical concepts

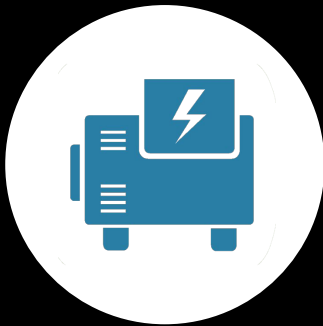
Tasks

1. Create a mod
2. Register a node for the generator (Single-phase generator, we are implementing AC)
3. Implement variables and data structures to store and display electrical power system values (voltage, current, etc.)
4. Register a node for the light
5. Implement GUIs for user input (used with generator block and light block)
6. Create a cable used to transfer the electrical current to the connected device

How it works

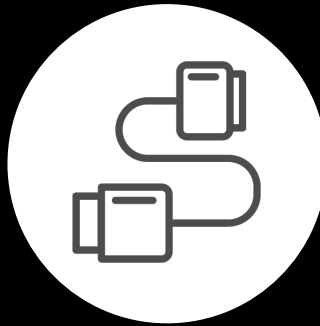
Step 1

Add a
generator block



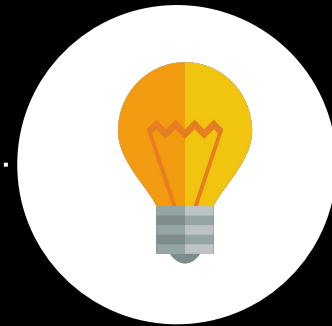
Step 2

Attach cable
block to
generator

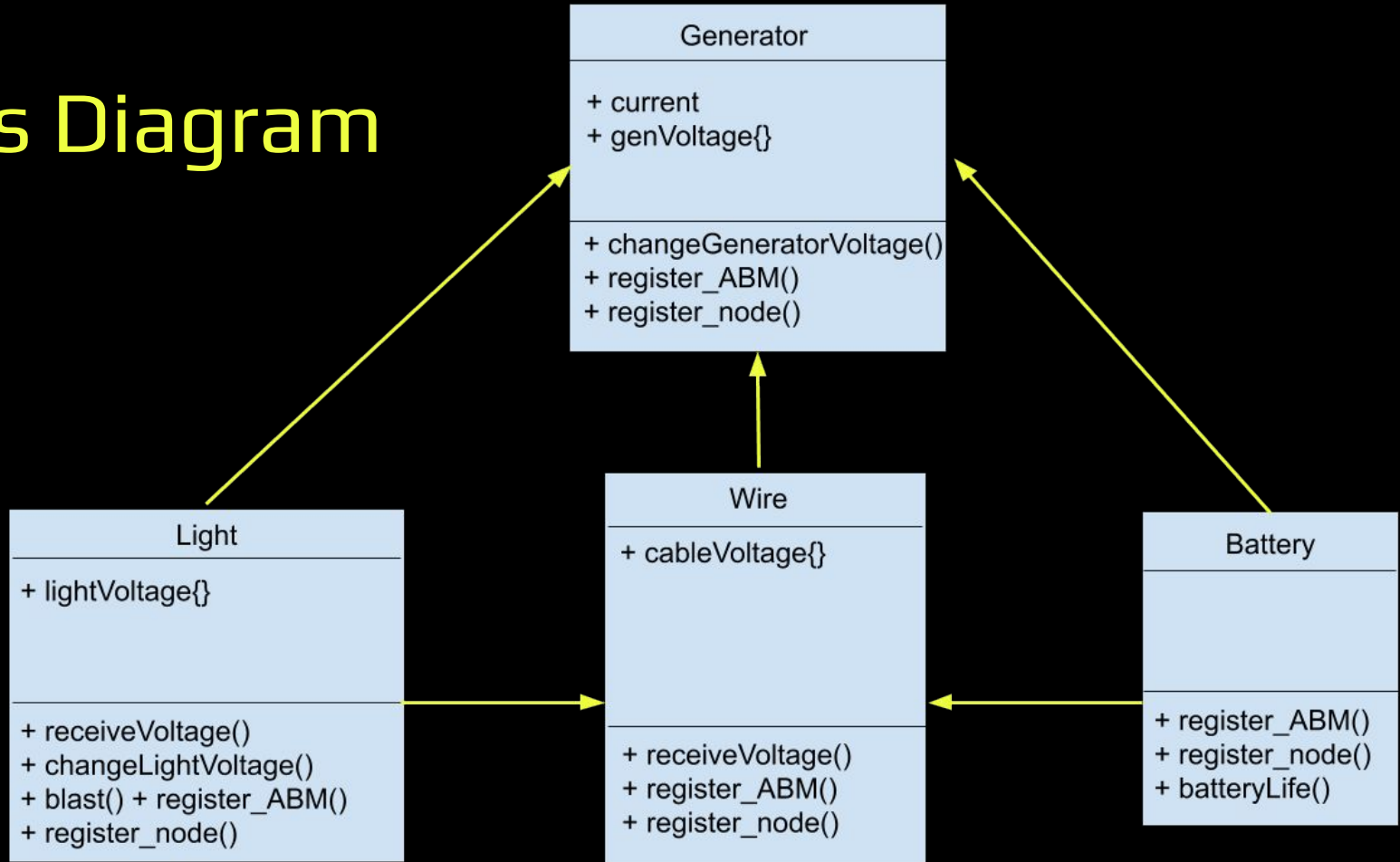


Step 3

Attach light
block to cable



Class Diagram



Development

- ❑ Minetest Modding Book
- ❑ Programming in Lua
- ❑ Active Block Modifiers
- ❑ Hash tables



Code

```
minetest.register_abm({
    nodenames = {"powercraft:generator"},
    neighbors = {"powercraft:cablewire"},
    interval = 1, -- Run every 1 second
    chance = 1, -- Select every 1 in 50 nodes
    action = function(pos, node, active_object_count, active_object_count_wider)

        local id = "X"..pos.x.."Y"..pos.y.."Z"..pos.z
        local node_pos = minetest.find_node_near(pos, 1, { "powercraft:cablewire" })
        if (node_pos and changed) then
            Wire.ReceiveVoltage(id, Generator.voltage[id])
        end
    end
end
})
```

Code

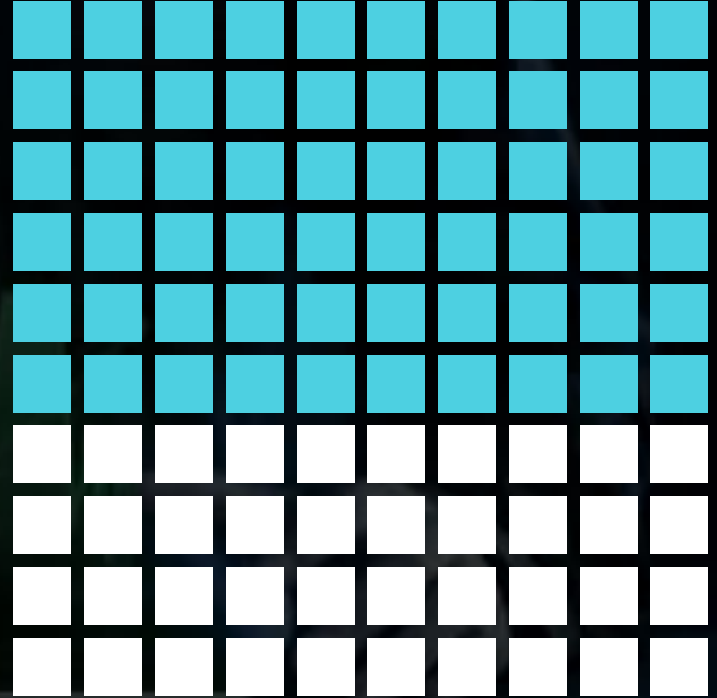
```
ChangeGeneratorVoltage = function(volt, pos)
  id = "X"..pos.x.."Y"..pos.y.."Z"..pos.z
  Generator.voltage[id] = volt
  voltage = Generator.voltage[id]
  local meta = minetest.get_meta(pos)
  meta:set_string("formspec",
    "size[5,5]"..
    "label[1,1;Previous Voltage : " .. voltage ..]"..
    "label[1,2; Set Voltage ]"..
    "field[1,3;2,1;newVoltage;Voltage;]"..
    "button[1,4;3,1;set;Set Voltage]")
  minetest.chat_send_all("Generator at: X"..pos.x.."Y:"..pos.y.." Z:"..pos.z.."Voltage: "..Generator.voltage[id])
  changed = true
end
```


Management

- ❏ Weekly Team Meetings
- ❏ Weekly Sponsor Meetings
- ❏ Google Drive
- ❏ Documentation

Future Work

1. Distributing current
 - a. Adding 2 or more generators
 - b. Adding 2 or more lights
2. Implement a battery to keep track of the current per second
3. Implement new nodes as power consuming devices (i.e. light, toaster, fan, etc)



Challenges & Lessons Learned

- ❑ Starting from scratch
 - ❑ Learning a new programming language
- ❑ Determine meeting schedule in the first two weeks of the semester
 - ❑ Communicate and meet regularly with all team members
- ❑ Learn from similar projects that were previously implemented
- ❑ Ask your sponsor questions
- ❑ Document any and all discoveries

“At its heart engineering is about using science to find creative practical solutions. It’s a noble profession.” –

Queen Elizabeth II