GPU SHOWDOWN & POWER PLAY: THE ELECTRIFYING EDITION

CSCI-1400 PC Setup & Maintenance | ETSU Department of Computing – BlueSky Institute | Benjamin Burton

OVERVIEW

Welcome, aspiring tech wizards and pixel pushers! It's time to put your GPU knowledge and power supply prowess to the test. This assignment is split into two electrifying parts: a team face-off that would make The Avengers jealous, and a solo mission that'll have you feeling like MacGyver with a multimeter.

PART 1: IN-CLASS | THE GREAT GPU GLADIATOR GAMES: BATTLE OF THE BUILDS

Attention, tech warriors! It's time to prove your GPU prowess in the ultimate PC-building showdown. Will your team reign supreme in this high-stakes battle of brains and builds? Let's find out!

Your Mission

1. Form your dream team (Please no more than 4 on a team)
2. Master a mysterious GPU series (no spoilers!)
3. Build the ultimate gaming rig
4. Crush the competition!

THE BATTLEFIELD

1. **The Great GPU Crusade**
    - Get your GPU assignment and form your team
    - Divide and conquer:
        - Team member(s) research the GPU: architecture, features, benchmarks
        - Team member(s) craft the war machine in PC Building Simulator or PC Part Picker
    - Your battle station must include: a) Your assigned GPU (of course!) b) A power supply fit for a champion c) Cooling worthy of your fire-breathing build d) Other parts to complete your masterpiece
    - Calculate power needs (no explosions on our watch!)
    - Prepare your 5-minute victory speech (presentation)
2. **Showcase of Champions**
    - Each team gets 5 minutes to:
        - Unveil your GPU research findings
        - Show off your ultimate build
        - Brag about your choices and power calculations
        - Prove why your creation will demolish the competition
3. **Crowning of the GPU Gladiators**
    - Champions are chosen
    - Bask in glory or plot your comeback

Remember, GPU Gladiators, this battle tests your tech knowledge, building skills, and ability to work under pressure. Outsmart, outbuild, and outshine the competition.

May the best team win, and may your GPUs stay frosty!

PART 2: INDIVIDUAL TAKE-HOME CHALLENGE - "POWER SUPPLY PUZZLES: SHOCKINGLY FUN EDITION"

You've been called in as a special agent to solve PSU predicaments. Your mission is to diagnose and solve a unique power supply mystery.

Process

1. Refer to the top-secret dossier with your "problem build" scenarios below.
2. For each scenario below, Fire up PC Building Simulator or PC Part Builder (your high-tech spy gear) and:
   a) Diagnose the issue (Channel your inner Dr. House, minus the attitude) b) Implement a solution (MacGyver would be proud) c) Document your process with screenshots (Pics or it didn't happen!) d) Write a brief report (1-2 pages, not a dissertation) explaining your heroic deeds for each problem build.

Report Requirements

- Explain your diagnosis (preferably without using WebMD)
- Detail your solution (as if explaining to your grandma... who's also a tech wiz)
- Show your power calculations (no "Integer Overflow" errors, please)
- Connect your brilliant solution to lecture concepts (impress us with your big brain energy)
- Include screenshots (think "PC Building Simulator: CSI Edition")

Dossier 1: Operation Watt Whisper

PC Build Specs:

- CPU: Intel Core i9-11900K
- GPU: NVIDIA GeForce RTX 3080
- RAM: 32GB DDR4-3600
- Storage: 1TB NVMe SSD, 2TB HDD
- Current PSU: 550W Bronze-rated

The Problem: This high-performance rig keeps shutting down under heavy load, especially during intense gaming sessions.

Your Mission:

1. Diagnose the likely cause of the shutdowns.
2. Calculate the appropriate wattage needed for this system.
3. Recommend a suitable power supply replacement.
4. Explain any other potential issues or upgrades you'd suggest.

Dossier 2: Operation Silent Thunder

PC Build Specs:

- CPU: AMD Ryzen 9 5950X
- GPU: AMD Radeon RX 6900 XT
- RAM: 64GB DDR4-3200
- Storage: 2TB NVMe SSD
- Current PSU: 850W Gold-rated

The Problem: The system runs fine but the PSU fan is extremely loud, especially during high-performance tasks. The user wants a silent operation without compromising performance.

Your Mission:

1. Determine if the current PSU is adequate for this build.
2. Research and recommend a high-quality, silent PSU option.
3. Explain the benefits of modular vs non-modular PSUs for this build.
4. Suggest any additional cooling solutions to maintain system performance while reducing noise.

Dossier 3: Operation Green Machine

PC Build Specs:

- CPU: Intel Core i5-12600K
- GPU: NVIDIA GeForce RTX 3060 Ti
- RAM: 16GB DDR4-3200
- Storage: 500GB NVMe SSD
- Current PSU: 750W Bronze-rated

The Problem: The user is concerned about high electricity bills and wants to optimize the system for energy efficiency without significant performance loss.

Your Mission:

1. Analyze the current power consumption of this build.
2. Recommend a more energy-efficient PSU, explaining efficiency ratings (80 Plus certification levels).
3. Suggest any component changes to improve overall system efficiency.
4. Calculate potential energy savings over a year based on average usage.

Dossier 4: Operation Future Proof

PC Build Specs:

- CPU: AMD Ryzen 5 5600X
- GPU: NVIDIA GeForce RTX 3070
- RAM: 32GB DDR4-3600
- Storage: 1TB NVMe SSD
- Current PSU: 650W Gold-rated

The Problem: The user plans to upgrade to a more powerful GPU and potentially overclock the CPU in the future. They want to ensure their PSU can handle future upgrades.

Your Mission:

1. Assess if the current PSU is sufficient for the planned upgrades.
2. Recommend a PSU that would support significant future upgrades (consider the next-gen GPUs).
3. Explain the importance of PSU headroom for stability and future-proofing.
4. Discuss any potential bottlenecks in the current system that might limit future upgrades.

THE GRAND SUBMISSION EXTRAVAGANZA

What to Submit

1. Team Presentation Materials:
    a. Slides or documents from your in-class presentation
    b. Screenshots of your magnificent PC build
2. Individual Power Supply Puzzle Report:
    a. Your 1–2-page report detailing your diagnosis, solution, and connection to lecture concepts for all four of the problem build scenarios.
    b. Screenshots documenting your problem-solving journey
    c. Any additional calculations or diagrams you created

How to Submit

- Compile all materials into a single report.
- Upload your masterpiece to D2L by the start of the next class.

Grading Breakdown

- Team Challenge (50% of total grade):
  - Technical accuracy: 20%
  - Presentation clarity: 15%
  - Justification of choices: 15%
- Individual Challenge (50% of total grade):
  - Problem diagnosis: 12.5%
  - Solution implementation: 12.5%
  - Power calculations: 10%
  - Connection to lecture concepts: 10%
  - Documentation quality: 5%