Topic: Integration

Problem: Using what you learned from the System Integration lesson, your Physical Definition block diagram and hierarchy exercises, generate a subsystem level integration plan.

Pointers/Tips:

- Assume all the components that comprise your subsystems have been integrated into a subsystem package.
- Think about what needs to be integrated first, or which subsystems depend on others.
- Start simple and take baby steps. Don't try to plan too much all at once.
- I have attempted this with a few of the subsystems for the ATM here:

1. RAM is installed onto the motherboard.
2. A central processor is installed onto the motherboard.
3. The power module is plugged into the ATM motherboard. The power switch is tested to ensure it powers the motherboard.
4. The hard drive is connected to the motherboard.
5. An external QWERTY keyboard with trackball mouse is connected to the motherboard for the purposes of loading software and performing tests (the ATM keypad is not designed for this).
6. BIOS software is loaded onto the motherboard. BIOS BITs are performed to ensure the BIOS operates.
7. The display and keypad are connected to the ATM. The display runs through RGB BITs to ensure all colors and pixels are operational and aligned properly.
8. The Operating System (OS) is loaded onto the motherboard and fully tested to ensure the OS operates.
9. The ATM software application is loaded into the OS and data checksums are tested.
10. Anti-virus software is loaded into the OS and performs an initial scan.
11. Test software is loaded into the OS for the integration of each element, containing faux signals and data to represent real data for the purposes of testing connections.
12. Each button and key from the keypad and display are pressed to ensure proper operation.
13. The cash management subsystem is loaded with either real or faux cash bills for the purposes of testing.
14. The cash management subsystem is connected to the motherboard.
15. The Test software sends faux data and signals into the ATM software / cash management subsystem, ensuring it delivers the appropriate amount of faux (or real) cash.
16. The modem is connected to the motherboard and a networking port.
17. Faux signals and data are sent to the ATM software / modem from the testing software, triggering the modem to send cash withdraw requests, deposit requests and account balance requests over the banking network. The data to and from the modem is collected and analyzed to ensure full compliance with Banking network ICD 45.YT-12.
18. The ATM Card Reader is connected to the motherboard.
19. A faux ATM card is inserted into the ATM card reader. The Testing software collects data from the ATM Card, ensuring that the data is accurate.

20. With the Faux ATM card inserted, a faux withdraw transaction takes place via the banking network's test-only server (requires pre-coordination).
21. The above step is repeated for deposit and account balance requests.
22. The Faux cash is removed and replaced with real cash.
23. The testing software is uninstalled.
24. All tests are repeated using real cash, a real ATM card and the actual ATM application on the real banking (non-testing) network.
25. Integration complete.

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