

Maury High School Case Analysis

Wesley Faxlanger

Dept. of Info Systems/Dec Sciences ISYS

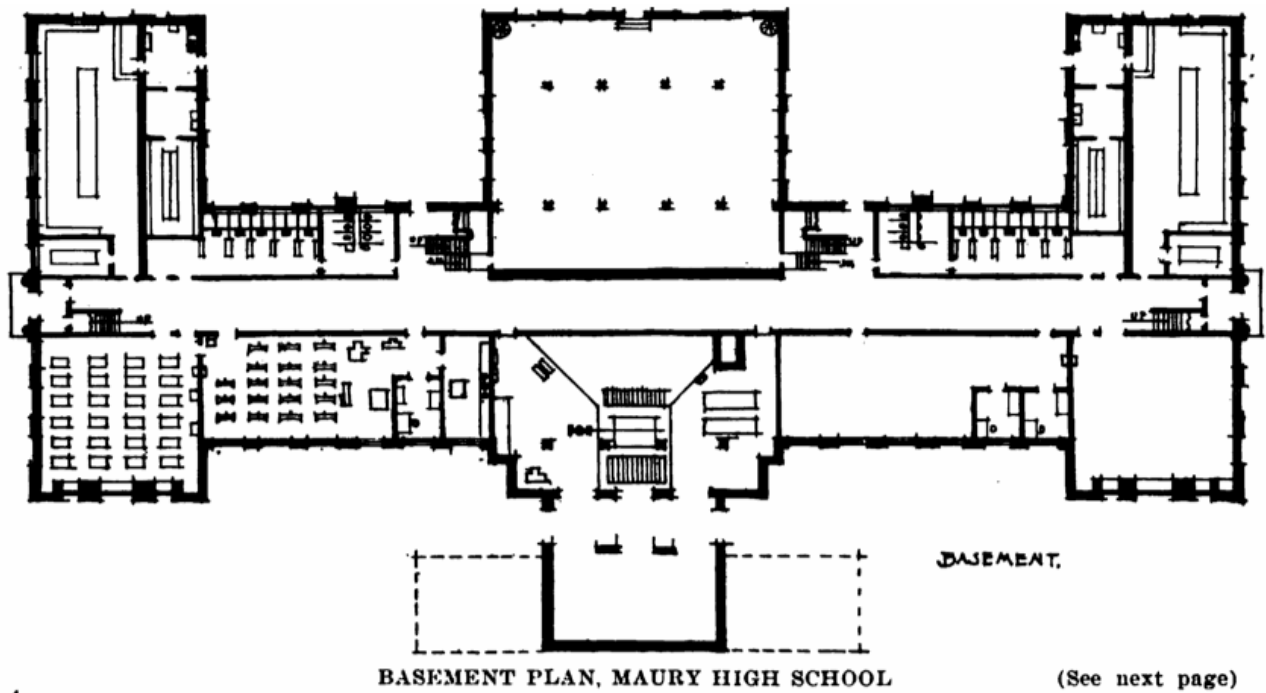
IT 315: Introduction to Networking and Security

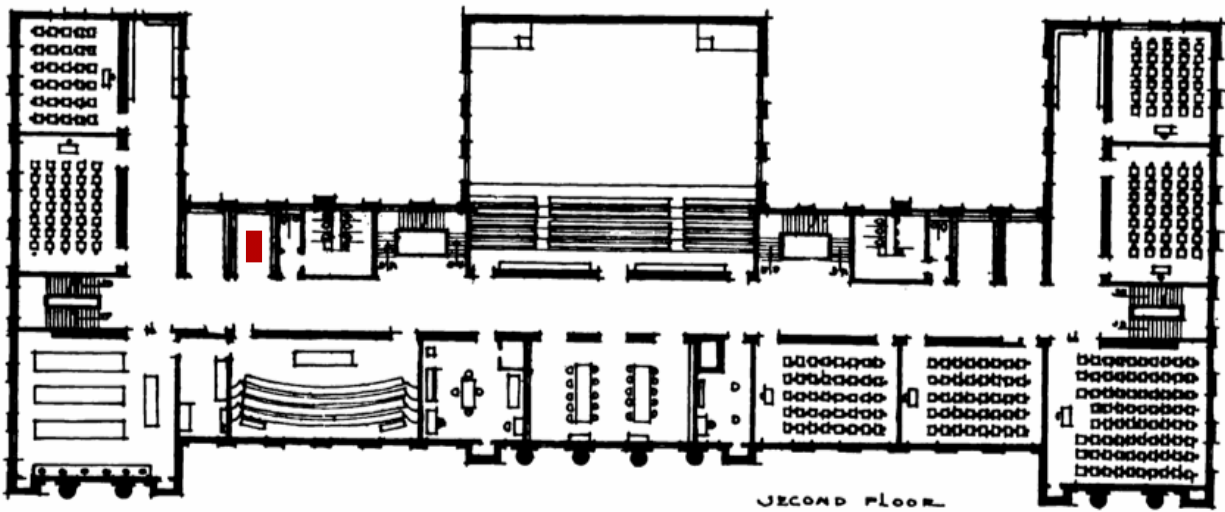
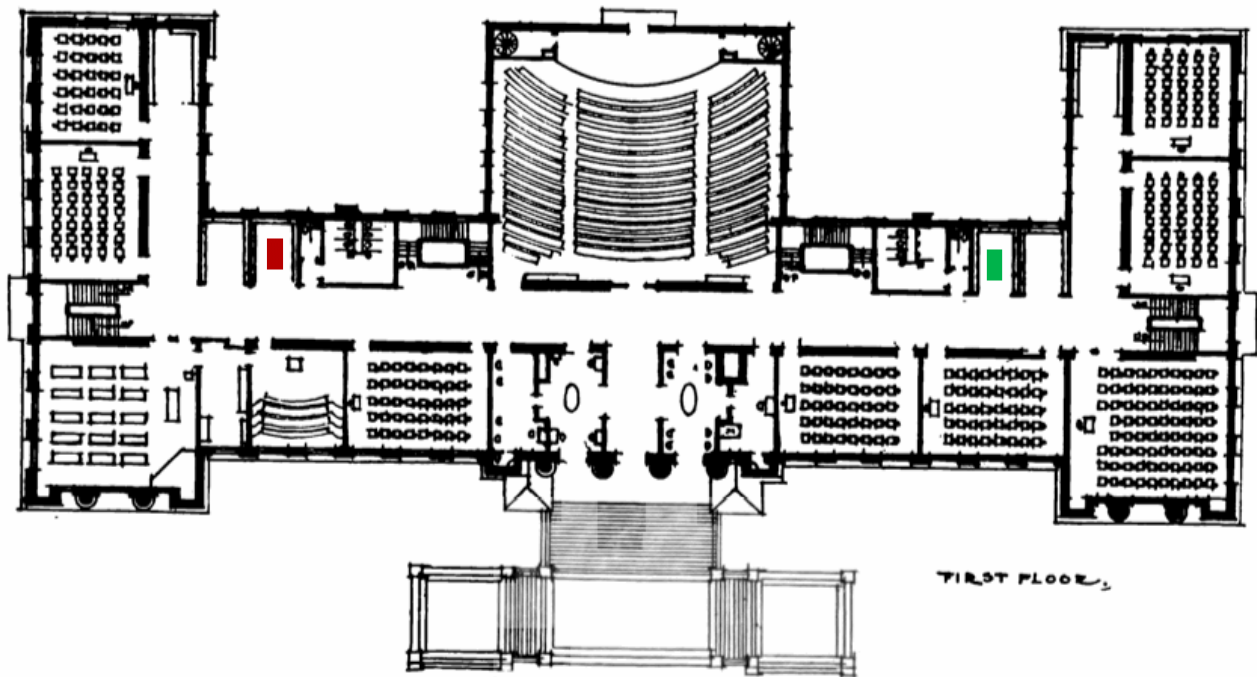
Vijay Kalburgi

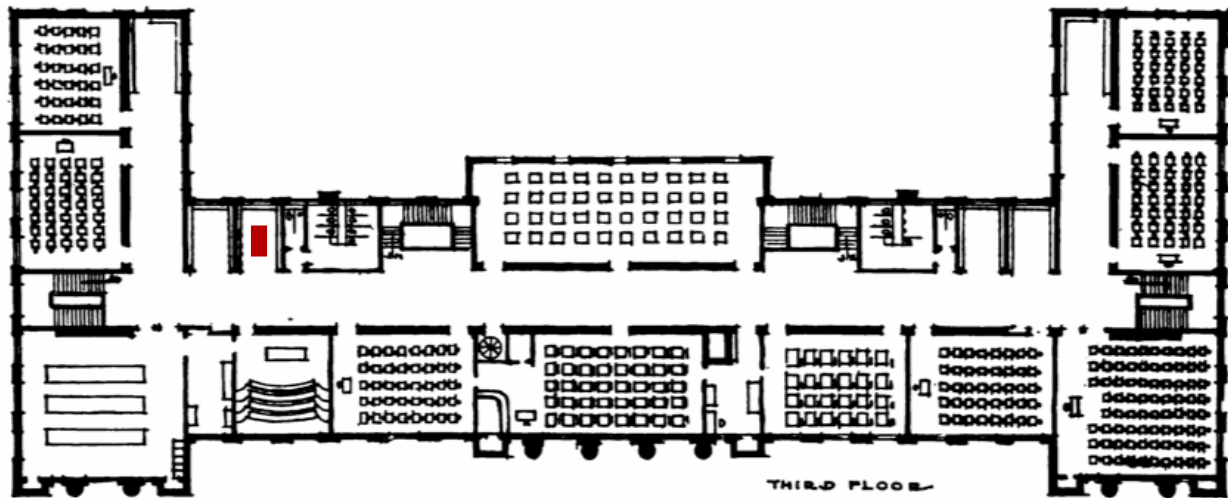
1 August 2024

Maury High School Case Analysis

PT.1







Measurements:

Scale: actual width = 300ft

Relative width = 8in

Conversion 1in = 37.5ft

Estimated floor to floor height = 13ft

Layout:

Green rectangle = Equipment room

Red rectangles = telecom closets

Cable lengths for connections between telecom closets and equipment room

First floor distance = 178.14ft

Second floor distance = 191.14ft

Third floor distance = 204.14ft

Total cable needed = 573.42ft

Cable runs from telecom rooms and equipment rooms to classrooms and offices

Basement

Total number of RJ45 outlets required = 24

longest cable run = 88ft

shortest cable run = 14ft

average cable length = 51ft

total number of rooms requiring cable = 12

total number of cables per room = 2

total amount of cable required = 51ft average cable length x 12 rooms x 2 cables
per room = 1224ft of cable total

first floor

1 telecom closet

48 port patch panel = 2

1 equipment room

48 port patch panel = 2

Total number of RJ45 outlets required = 38

longest cable run = 138.5ft

shortest cable run = 4.69 ft

average cable length = 71.6ft

total number of rooms requiring cable = 19

total number of cables per room = 2

the total amount of cable required = 71.6ft average cable length x 19 rooms x 2
cables per room = 2,720.8 ft of cable total

second floor

telecom closet

48 port patch panel = 2

Total number of RJ45 outlets required = 38

longest cable run = 269.75ft

shortest cable run = 4.69ft

average cable length = 150.72ft

total number of rooms requiring cable = 19

total number of cables per room = 2

the total amount of cable required = 150.72ft average cable length x 19 rooms x
2 cables per room = 5,727.36 ft of cable total

Third floor

telecom closet

48 port patch panel = 2

Total number of RJ45 outlets required = 38

longest cable run = 269.75ft

shortest cable run = 4.69ft

average cable length = 150.72ft

total number of rooms requiring cable = 19

total number of cables per room = 2

the total amount of cable required = 150.72ft average cable length x 19 rooms x
2 cables per room = 5,727.36ft of cable total

Total amount and cost of materials used

Cat 6 plenum cable

total length of cable required for all floors = 15,972.94ft

cable used = Cat 6 plenum cable unshielded 1000ft x 17

price per 1,000ft of cable = \$291.52

total cost of cable = \$4,995.84 plus tax

parts sourced: <https://www.truecable.com/products/cat6-plenum-ethernet-cable-unshielded-1000ft?variant=13383860781123>

Cat 6 toolless keystone jack's unshielded

Total amount of RJ45 jacks required = 138

RJ45 jacks used = Cat6 Toolless Keystone Jack, Unshielded 12pc x 12

Price per 12-pack of RJ45 jacks = \$19.49

Total cost of RJ45 jacks = \$233.88 plus tax

Parts sourced: <https://www.truecable.com/products/cat6-toolless-keystone-jack-unshielded?variant=31948406161475>

2 port keystone wall plates

The total amount of 2 port keystone wall plates required = 69

Keystone wall plates used = 2 Port Keystone Wall Plate Decora Type – Ivory 1pc

Price per keystone wall plate = \$0.69

Total cost of keystone wall plates = \$47.61 plus tax

Parts sourced: <https://www.sfcable.com/2-port-keystone-wall-plate-decora-type-ivory.html>

Cat6 48 port patch panels

The total amount of Cat6 Patch Panels, 48 Port required = 8

Price per Cat6 patch panel = \$92.99

Total cost of patch panels = \$473.92 plus tax

Parts sourced: https://www.showmecables.com/cat6-patch-panel-48-port?gad_source=1&gclid=CjwKCAjw5Ky1BhAgEiwA5jGujpcypTKjRGVV4Hp6jWRYv3HIF6IMGzq7uTuoaUXGi5Rusp6mdc9eEBoCa6kQAvD_BwE

Total price for PT.1 = \$5,751.25 plus tax

PT.2

First-floor telecom closet and equipment room patch cable requirements

2x 48-port patch panels are required in the telecom closet and equipment room

2x 48-port managed switches are required in the telecom closet and equipment-room

32 patch cables are required for the equipment room and telecom closet

A firewall will be located in the equipment room

Second-floor telecom closet requirements

2x 48-port patch panels are required in the telecom closet

2x 48-port managed switches are required in the telecom closet

38 patch cables are required for the telecom closet

Third-floor telecom closet requirements

2x 48-port patch panels are required in the telecom closet

2x 48-port managed switches are required in the telecom closet

38 patch cables are required for the telecom closet

Over 100 feet of Cat 6 cable is left over from running connections to each room. This cable will be used to build patch cables and crossover cables for the telecom closets and equipment room.

2x 100pc Cat6/6A Pass Through RJ45 Connectors, unshielded

The total amount of RJ45 connectors needed: 192

Price per 100pc RJ45 connector = \$33.99

Total cost of RJ45 connectors = \$67.98 plus tax

Parts sourced: <https://www.truecable.com/products/cat6-6a-rj45-pass-through-connectors-unshielded?variant=31471065825347>

NETGEAR 48-Port Gigabit Ethernet Smart Switch (GS748T) - Managed, Optional 1 Year Insight Cloud Management, with 2 x 1G SFP and 2 x 1G Combo, Desktop or Rackmount, and Limited Lifetime Protection

The total amount of managed switches required = 8

Price per switch = \$396.99

Total cost of switches = \$3,175.92 plus tax

Parts sourced: https://www.amazon.com/NETGEAR-48-Port-Gigabit-Ethernet-Managed/dp/B00I5W5M12/ref=sr_1_3?crid=EOLKX34XH0E8&dib=eyJ2IjojMSJ9.S20afhLSnZI29eok-wW3riGo1QgaUK-zfDY-sdGmxEz_fGnoTzRJmb0_IWrSXwGgpHy1VaJ8LKKlqVWeQVC3hDM-hr3Nf8GLxZ6Yu40D2uNq5yDJUhU7VZgDipQm0EJJkyhsFQ-n_IM6eKLyEbw0l-GhIUvHFE37IKTdHI8WqNZxr4gM0hZBHktOU-EWZGH6FfaXfd0uml3IP_imjROhQGDEIRttTs9_FE7mug-DDuUoJwMxgv4yM1g-iDCfd6l1-9IUUmOb2dPQG-M3s8M5Gcrx2IV1I0vSXaPvernagQ.t1Dx2Wk4l73KfnSpmssTikIXt53TZ4xmUDFUyS7vKuk&dib_tag=se&keywords=48+port+managed+switch&qid=1722560669&s=electronics&sprefix=48+port+managed+switch+%2Celectronics%2C71&sr=1-3

Total cost for PT.2 = \$3,243.90 plus tax

PT.3

The firewall will be located on the first floor in the equipment room

FortiGate-100F Hardware plus 5-Year FortiCare Premium and FortiGuard - Enterprise Protection

Price for hardware = \$1,990.17

The price for 5 years of FortiCare Premium and FortiGuard Enterprise Protection = \$7,189.49

Total cost of hardware and 5-year subscription = \$9,179.66 plus tax

Estimated total cost for project = \$18,174.81 plus tax

My network design utilizes an extended star topology, as every user device connects to a switch that connects to the equipment room or is already located in the equipment room. While the original plan was to place the equipment room in the basement, as presented in the assignment diagram, no office space was available. The separate VLANs for students and staff will be achieved by assigning ports 1-24 on a switch to staff and giving staff priority on the network. Ports 25-48 will be assigned to students. This network design will help to ensure QoS for staff and allow different restrictions to be set between subnets.

