Source Booklet, 2022

UNITS 3 AND 4

YEAR 12 COMPUTER SCIENCE ATAR

Ivan's Industrial Design Engineering firm specialises in tooling design and manufacture. They have a team of five (5) design engineers and a factory comprising twenty (20) employees. The administration team employs five (5) including Ivan. All employees are based at the same premise.

Significant growth in the demand for individually designed locking systems that secure banks of laptops, tablets and other computing equipment has put significant pressure on their current network and sales and invoicing systems. They are renowned for developing innovative solutions for all major computer manufacturers that enable multiple devices to not only be secured but to be charged as well.

The company has an excellent reputation of producing solutions that are compliant with all relevant legislation and are rugged enough to withstand extreme environmental stressors. They have attracted international companies such as Dell, Hewlett Packard and Acer.

You have been employed as a System Analyst and have assessed the current data used by the Administration Team for invoicing as well as their other software, internet and hardware needs. In addition, you have studied the current hardware and network being run on the premises.

You have established the following:

Sales and Invoice System

- New customers need to apply for a customer account. If approved, they will be supplied with a unique customer identification to submit orders online.
- A job Joborder will come through via a website order. This will be stored, and a design engineer will be allocated to the commercial contract.
- The job will be assigned to a design engineer depending on experience and expertise required and who is available. They will meet with the client to establish a brief and provide a quote for the job cost. These documents will be stored on the customer file until the customer accepts the quote. The they will be passed onto the Administration team.
- The Administration team will create an invoice the customer will be required to sign a contract detailing the work scope and pay 30% deposit on the invoice. Once this is paid and the contract is signed, the design engineer will set about creating CAD designs for rapid prototyping. Both the invoice is stored in the customer file and the contract is stored in a file called Current Projects.
- The developed design prototype will go to the customer will be contacted to approve the prototype for approval
- If the customer is satisfied, production of the number of units required will begin and the customer is required to pay the balance of the invoice. The current projects file will be updated to indicate manufacturing has commenced.

The network and hardware system

Staff in Ivan's organisation are organised into departments.

- There are the 5 design engineers in the Design Department. They use CAD software to design and render their solutions. They need fast powerful computers to generate the large files that are then stored on a dedicated server and their current computers are over 5 years old. They share a networked printer that print up to A1(4 x A3). The team often complain about time delays when they are printing, storing or retrieving their files.

- The manufacturing team has a team of 10 people who make the products on powerful machines that include lathes, laser cutters, 3D printers. They have 10 desktop computers they use to view designs and project manage the work in consultation with the design engineer. These are six years old and are continually breaking down. They also have networked lathes and 3D printers.
- The administration team comprising of Ivan and four other employees also use 5 computers that are 7 years old to access the payroll software and the Microsoft office suite. They have noted that creating even small word processing documents produces lagging behaviour on the machines.
- All computers in the company use the Microsoft office suite
- There is a fast NBN connection to the internet over a dedicated fibre optic cable to the NBN box. There is a hardware proxy firewall/router server managing this connection and this is connected to a router that has a gigabit ethernet connection to the only switch in the organisation.
- All applications, design data and the CAD software along with financial data is stored on a server
- The servers are connected to a switch with 100Mbps connection.
- Connected to the switch is a Wireless Access Point. All employees can access the internet over this with their personal mobile devices however they often complain they cannot access this service and the network is really slow during designated break times.
- The switch is a 24 port fast ethernet.
- The network uses TCP/IP on UTP cabling that tracks through the roof alongside electrical cables. The entire building is over 100m long. All PC's are connected to the switch and in the manufacturing area, the cabling is taped to the wall behind the machinery to prevent it becoming a tripping hazard. The walls are concrete formwork

Your preferred supplier provides the following prices on their devices.

Device	Specifications	Unit Cost
Fast Ethernet Switch	100Mbps 5 x Rj45 Ports Unmanaged	$120.25
Fast Ethernet Switch	100Mbps 5 x RJ45 Ports Managed	$250.00
Fast Ethernet Switch	100MBps 16 x RJ45 Ports, Managed	$850.22
Gigabit Ethernet Switch	1Gbps 28 x RJ45, Managed, 1085	$1085
Gigabit Ethernet Switch	1Gbps 10 x RJ45	$340.00
CAT5e (UTP)	100Mbps – 30 metres	$34.95
Cat6 (STP)	1000Mbps – 1 metre	$5.80
Intel i3 Desktop	4 cores, 12 MB cache 4.3 Ghz,8 Gb RAM, 256 GB ssd; Intel UHD Graphics 730	$898.995
Intel i5 Laptop	6 cores, 4.4 Ghz; Intel UHD Graphics 770, 16Gb RAM, 512 SSD	$,1338.00
Intel i7 Desktop	12 cores, 4.8 GHz, Nvidia GeForce, 1TB SSD	$1,748.00
Dual Band Wireless Access Point	5GHz 802.11 a/b/g/n	$287