CPT110 – Introduction to Information Technology
Assignment 2

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Introduction

I have been tasked by Dave to help him in the selection of a series of Computer components. Dave's core requirements are that everything work correctly under a variety of roles, be compatible with each other and come in for around the $650 - $750.

Thankfully as I will show in the following document I have been able to achieve all of Dave's goals without any compromise in the system.

The Case

Selected Case – Cooler Master Elite 341 ($70).

Dave's requirements for a case called for a sleek black case that was relatively plain in appearance and not overly large. Additionally the case needed to be able to accommodate future expansion to Dave's system without necessitating a replacement purchase.

The Cooler Master Elite is a straight forward black case which supports Motherboards which conform to the Micro-ATX sizing standard [1].

In terms of size the case comes in at 18.5cm width, 36.5cm high and 40cm depth. This compares favourably to other cases available from Brickworkz Computer Supplies such as the Cooler Master Centurion V II (20.2cm x 44cm x 48.5cm) [2] or the ThermalTake Armor+MX (53.5 x 24 x 49) [3]. Whilst smaller cases were available the Elite 341 also supported Dave's request that it cater for future expansion with space to hold up to 4 3.5" drives.

The PSU

Selected PSU – Antec VP-650P 650W Strictly PSU ($91) [4].

Unfortunately the selection of the Cooler Master Elite 341 poses one slight issue for Dave.
The Cooler Master Elite 341 does not come bundled with a Power Supply Unit and Brickworkz Computer Supplies does not appear to stock stand alone PSU units.

I have provided Dave with a link to an Antec PSU from a website I have previously used for purchasing individual components.

Our primary concern when choosing a PSU is ensuring we have adequate power to sufficiently run our system. For this build our system will be using (under full load) a total of 616 watts which is unlikely to be realized in real world scenarios. Even allowing for this our 650 watt power supply is more than adequate for such a scenario.

Processor

Selected Processor – Phenom II X6 1090T ($150).

Dave's request for his Processor was to get the best bang for his buck in the sub $300 price range. The table below demonstrates the AMD Phenom II X6 1090T leads the pack in a price/performance standpoint when using the CPUMarks benchmark standard [5].

Dave expects the most complex task that he will be required to use the PC for is to encode digital video, the Phenom II X6 1090T is very capable of this task being one of the better processors on the market at encoding digital video [6].

Whilst idle the Phenom II X6 1090T consumes approximately 83 watts of power, whilst under load this increases to approximately 229 watts [9].

By choosing the Phenom II X6 1090T we must ensure that our Motherboard has support for the AM3 socket used by this processor.

CPU	Cost	CPUMarks	CPUMark/$ Ratio	Notes
Intel				
Core i3 2130	$147.00	4461	30.35	
Core i5 2500	$220.00	6650	30.23	
Core i7 2700K	$368.00	10300	27.99	Too expensive
Core i7 960	$314.00	6671	21.25	Too expensive
Pentium G850	$90.00	2756	30.62	
AMD				
A6 3500	$88.00	3015	34.26	
FX-6100	$180.00	6060	33.67	
FX-8120 Oct Core	$235.00	7243	30.82	
Phenom II X4 960T Black Edition	$138.00	4040	29.28	
Phenom II X6 1090T	$150.00	6060	40.4	

Motherboard

Selected Motherboard – Gigabyte GA-78LMT-S2P ($66).

For the Motherboard Dave's request is simple something that works and if possible has some future expansion possibility.

The final choice came down to the Gigabyte GA-78LMT-S2P and the Gigabyte-GA-970A-D3, both of which support the AM3 socket of our chosen Processor [7], [8].

The below table demonstrates some of their basic attributes, as can be identified they share the same amount of SATA connectors. The only place in which they vary which has an impact on Dave is the number of Memory slots.
Whilst it would be preferable to have the larger capacity of memory slots available in the D3 at the end of the day the decision was simply based around price. For Dave's purposes I simply could not justify spending over triple the amount for (effectively) only an additional 2 memory slots.

In choosing this motherboard we have accommodated our AM3 socket processor, in addition to this we have set ourselves up to use the current DDR3 RAM and install a PCI Express based Graphics Card.
For Hard Drives and Optical Drives we will connect to the motherboard using the 6 supplied SATA 3 connectors which are all capable of 3GB/sec favoured by newer Hard Drives for optimum performance.

I was unable to locate published power usage figures for this motherboard, however what I did locate was a listing of 6 of the slightly older AM2 socket with the minimum used being 34 watts and the maximum being 43 watts [10].

Motherboard	CPU Manu	SATA Conn	Memory Slots	Notes
Asus P8H61-USB3-V3	Intel	4	2	Wrong CPU Support
Gigabyte GA-78LMT-S2P	AMD	6	2	
Gigabyte GA-970A-D3	AMD	6	4	
Gigabyte GA-A75M-UD2H	AMD	5	4	Incompatible Socket
Gigabyte GA-Z68XP-UD4	Intel	6	4	

Memory

Selected Memory – Kingston 8GB 1600HX - $75

Again Dave's requirement here is simple he just wants something that works.

The Kingston 8GB1600HX is a single 8GB stick of DDR 3 RAM. We have two available slots for DDR 3 RAM included on our selected motherboard.

For the recommendation I have taken into account that our eventual Motherboard only contains 2 Memory Slots. As such I have selected the larger 8GB stick of ram to allow him one free slot for future expansion which he may like to do.

For the power usage I again had difficulty sourcing exact figures for specific models of Ram. One website I located listed the average consumption of 1.8v 4GB ram at approximately 10.5w at load [11], to ensure we adequately cover our requirements I will draw the estimate for our system as 25 watts.

Optical Drive

Selected Optical Drive – Liteon IHAS324 DVD-RW - $24

The easiest part of the build to select, Dave's requirement for an optical drive was that he would be able to record home movies onto DVD and backup his work.

For this purpose the Liteon IHAS324 DVD-RW will be sufficient. The iHAS324 is an internal DVD-RW which will connect to our motherboard via SATA for fastest possible transfer speeds [12].
The drive is capable of write speeds of up to 24x depending on the media supplied to it and will be able to fulfil Dave's needs accordingly.

Finding the power consumption of optical drives was quite problematic however one source lists an Optical Drive + Burner as consuming approximately 20 watts [13].

Hard Disk

Selected Hard Disk – Seagate Barracuda 500GB - $80

For the Hard Disk Dave's initial needs are only modest. To start the system off we will install a Seagate Barracuda 500GB 3.5" Drive. The Seagate Barracuda will be connected to our motherboard via 1 of our 6 SATA 3 connectors.

The Hard Disk will sit in one of the four available spaces in our case. For expansion we have ample (4) SATA 3 connectors as well as 3 spaces inside our case.

As per Dave's belief of Hard Drive prices dropping over time we have opted for the second cheapest drive available. Our reasoning behind not choosing the Western Digital 160GB IDE is twofold.
1. It uses the older IDE connector which is considerably slower.
2. For a tiny cost increase of $1 we are more than tripling our storage space by proceeding with the Segate drive.

The Power Consumption of this drive is at 6.9 watts at idle and increases to 8.1 watts during seek.

Graphics Card

Selected Graphics Card – Gigabyte HD6870 1GB - $201

For the Graphics Card our primary concern is ensuring full connectivity with Dave's plasma TV.
Dave has informed us that his Plasma TV is able to receive signals via HDMI, VGA and Component connectors. The connection type we will be using is the HDMI (High Definition Multimedia Interface) connection [15].
Via this connection we can not only provide video in full HD but we can also pass through sound via the Graphics Cards HDMI sound output.

The Gigabyte HD6870 will connect to our motherboard via the PCI Express x16 slot.

The reason for choosing the Gigabyte HD6870 over say the Zotac 512MB Ion ($69) is the stronger compatibility with Kubuntu. The AMD website contains links to Linux drivers for this Graphics Card [14]. Compare this to the Zotac for which I could find no official or unofficial driver support for Linux. If Linux compatibility was not considered to be a requirement I would have no hesitation recommending the Zotac card which otherwise meets all of Dave's requirements at a far lower price point.

The power consumption of this Graphics Card can vary from a low idle of 172 watts to under full load at 291 watts [16].

Overall Build Summary

Item	Description	Cost	Power (load)
Case	Cooler Master Elite 341	$70.00	NA
PSU	Antec VP-650P 650W Strictly PSU	$91.00	NA
Processor	Phenom II X6 1090T	$150.00	229 watts
Motherboard	Gigabyte GA-78LMT-S2P	$66.00	43 watts
Memory	Kingston 8GB 1600HX	$75.00	25 watts
Optical	Liteon IHAS324 DVD-RW	$24.00	20 watts
Hard Disk	Seagate Barracuda 500GB	$80.00	8 watts
Graphics Card	Gigabyte HD6870 1GB	$201.00	291 watts
TOTALS		**$757.00**	**616 watts**

Overall we have managed to build Dave a complete PC within his budget ($757 against an intended target of $650-750) which is capable of fulfilling all of his initial requirements.

Whilst doing this we have also left room to allow for future expansion such as many free drive bays to allow for future media storage or RAM that can be added to at a later date.

The PC will both be able to run as a desktop PC and work admirably as a Home Theatre PC.

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