

## ***Uses of Information Technology in Shopping***

Most shops use computers to keep track of their stock. Stock is the word used for all the different things a shop sell. In a toyshop stock would include teddy bears, toy soldiers and dolls. In a supermarket, stock would include tins of baked beans, milk, cheese, crisps, fruit, toilet rolls etc.

The shops set up a STOCK FILE.

A typical STOCK FILE is shown below:

Item No. (EAN)	Item Description	No. in stock	Cost per item	Selling price	Reorder level	Supplier's name
	Spaghetti	400	12	20	300	Heinz
	Tuna	350	35	54	400	John West

Looking at the file above, we can see that there are fewer tins of tuna in stock than the reorder level. This means the shop needs to re-order Tuna

The computer will have a program with instructions such as:-

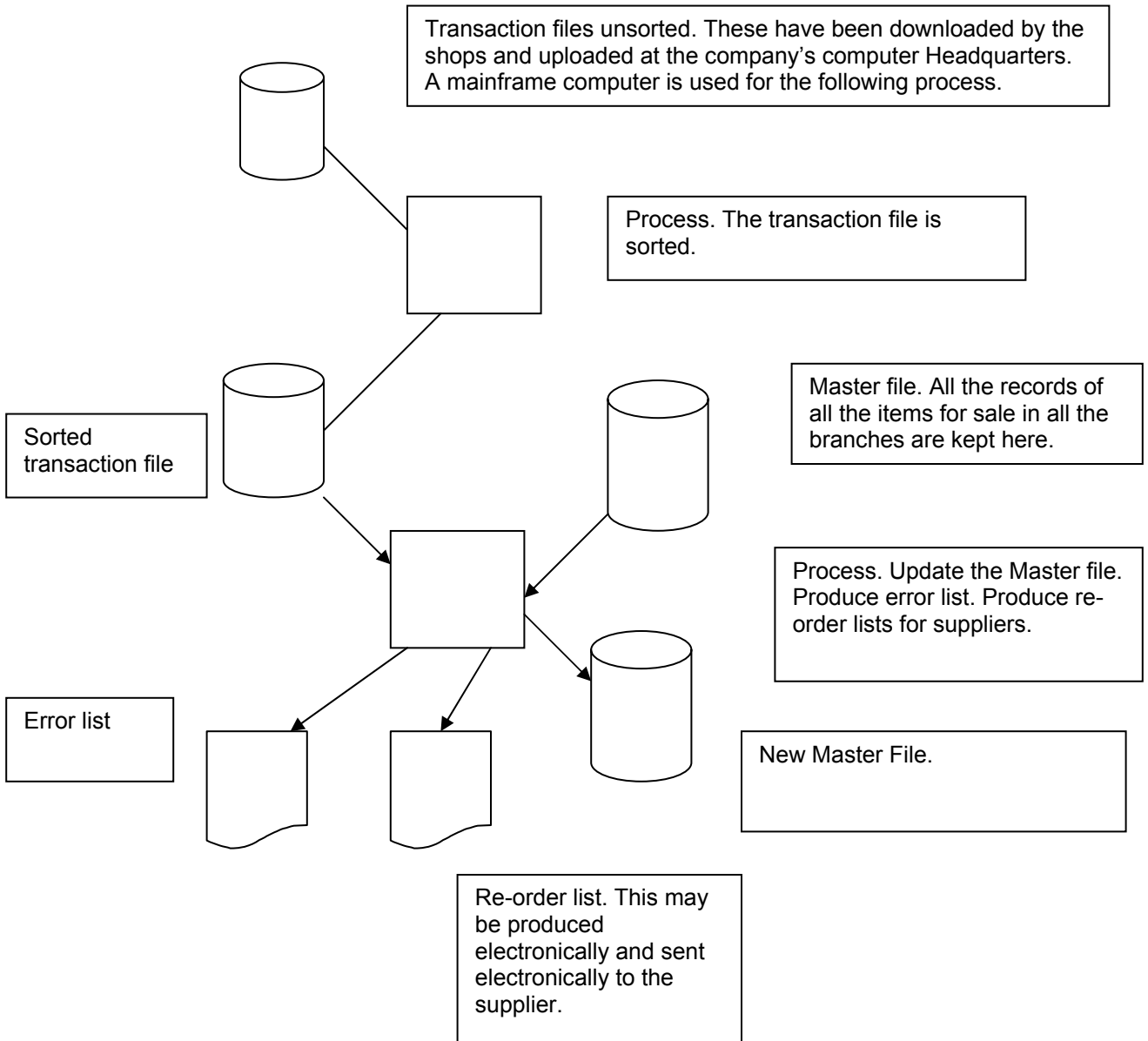
IF No\_in\_Stock < Reorder\_level PRINT re-order form for supplier

The computer will look up all the items for each supplier that needs to be re-ordered and produce a list. Below is a possible list for Heinz.

Heinz Anytown PO1 5ST Supplier No 1232455 16 <sup>th</sup> March 1998	MyShop, 10, Our Street, Large Town, MY2 3OS		
Please send to MyShop the following:-			
Item No.	Item Desc.	Item Cost per Box	Quantity
5 000157 001719	Baked Beans	25.99	20
5 000157 006875	Spaghetti	18.50	10

Companies like Tesco use Mainframe computers in their Head Office. Every night the Mainframe updates all the Stock Master Files and works out the Re-order lists for the suppliers. Then the Mainframe downloads to a Minicomputer in each shop a list of all the new costs and special offers on all the items in their store. The Minicomputer downloads the prices of the two hundred most popular items to the computer in the cash desk. This means the prices can be looked up very quickly. If the cash desk computer can't find an item in its memory, it queries the minicomputer. The minicomputer sends the information needed to the cash desk. It also keeps tabs of all the hits each item is getting and if any item is being asked for a lot, it gets switched into the memories of the computers at the cash desk and one item is pulled out of the cash desk memory.

.System flowchart for Stock Control.



A **mainframe** has a tremendous amount of storage, usually in terabytes, very fast processing speeds, at least a 64 bit architecture and is often a parallel processor.  
A **minicomputer** is less powerful than a mainframe.  
A **microcomputer** is the least powerful.

However in the last few years, we have seen microcomputers arrive with greater processing power than a mainframe less than three years older. It is becoming very hard to define the difference between them.

All items in shops have article numbers, these are known as EAN European Article Numbers. They are on the bottom of every bar code. A bar code is shown below. As you can see, **a bar code is a pattern of parallel black and white lines used to represent a code number, which can then be read automatically.** It is used in shops to identify a product at the cash desk so that its price can be found automatically from the computer. This saves the cash-till operator keying the details in.

Here is a bar code with 13 digits, an EAN number



Did you notice the first 7 digits were the same for both Heinz items? Look at the bar code above. Can you see the two longer parallel lines splitting the 13 digit number into 2? The first 7 digits to the left of those lines, represent the company producing the item. i.e. the **company reference**. The next 6 digits are the **item reference** and the last digit is the **check digit**.

What information is shown in a bar code?  
Answer: the **company reference, item reference, check digit.**

Did you notice the item numbers, in the list to the suppliers, They were 13 digits long. They were EAN numbers, European Article Numbers. **EAN numbers can be validated using a Modulo 10 Check.**

Take 502645173885 4

Is this a **valid EAN?** Let's use the **Modulo 10 method** and check.

1. Add together alternate digits beginning with the second  
 $0+6+5+7+3+8+5 = 31$

2. Multiply this answer by 3

$$31 \times 3 = 93$$

3. Add together all the remaining digits apart from the last digit, which is the check digit

$$5 + 2 + 4 + 1 + 3 + 8 = 23$$

4. Add together the answer to step 2 and step 3

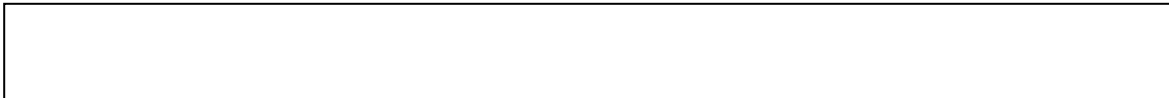
$$93 + 23 = 116$$

5 The check digit is the smallest number that has to be added to the answer in step 4 to make it a multiple of 10.

Next multiple of 10 is 120  
 $120 - 116 = 4$

6. The check digit is 4 so this number was valid.

Input devices to read bar codes are called scanners. You can have hand held scanners as used in Safeways Shop and Go. Here is a hand held scanner.



Shop and Go in Safeways allows the customer with ABC cards to use handscanners, ("Handiscan") themselves to scan the bar codes of the items. To get a handscanner the ABC card has to be placed into a card receiver slot. A light then flashes to indicate the handscanner to take from the rack.

Items can be deleted as well as added to the list. At the end, the handscanner is placed in a rack and a few moments later the bill is produced.

The bill can then be paid. It is technically possible to shop without help from a human being as in theory you could place your credit card into a credit card receiver to pay for the bill.

We may well see automatic shopping facilities in large towns in the small hours of the night in future.





This is a Liquid Crystal Display .  
The description and cost of each  
item as it is scanned appears as  
shown in the picture

#### **EFTPOS Electronic Funds Transfer at Point-of-Sale**

**EFT Electronic Funds Transfer is the use of computer networks to transfer money.** In shops, the purchaser offers a debit card which is processed in the same way as a credit card, but which initiates the transfer of money from the purchaser's account directly to the shop's account. You have probably seen your parents offer a Switch card at the till in Safeway or Tesco or Sainsbury and the cashier swipes the card through a card swipe machine. Some card swipe machines are built into the till, as you can see in the picture.

Each card has a magnetic stripe on it which the machine can read.

#### **Advantages of using an EPOS system for the customer include:**

- ☺ Much faster service at the checkout till – without a scanner the number on each item would need to be keyed in by the shop assistant
- ☺ Scanning the goods gives greater accuracy than keying in the product numbers
- ☺ An itemised receipt describes the purchase and shows the price.
- ☺ The computerised system makes multibuys easy to operate eg 'Buy two, get a third free'
- ☺ Goods are more likely to be fresh as the system improves the control of stock.

#### **Advantages of using an EPOS system for the store manager include:**

- ☺ Customers pass through the checkouts more quickly and with less errors being made by the assistants.
- ☺ Goods in the shop do not have to be individually priced: only the edge of shelf price label needs to match the price in the computer
- ☺ The control of stock is fully automated: as each product passes through the checkout the level of stock is adjusted.
- ☺ More efficient stock control means less stock needs to be kept, thus saving on both space and money
- ☺ As all the sales are monitored the managers can monitor the demand at the checkouts and ensure the correct staffing level.

☺ Question Time

- a) Goods sold in a supermarket have bar codes printed on them. For example a tin of dog food has a bar code printed on it. Name at least **three** items of information in a bar code. [3]

.(This is not nice, there are only **two** items of information and a check digit. It is true that the item reference will allow you to look up more details. Feel free to point this out to the examiner but give them a third detail. Do not risk losing a mark ever!)

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- b) A customer buys a tin of dog food in the supermarket. She takes it to the *checkout*. The checkout is a *Point of Sale terminal* (POS terminal)

Name and briefly describe at least **two hardware devices** attached to the POS terminal that are used for *input*.

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Name and briefly describe at least two hardware devices attached to the POS terminal that are used for output.

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- c) The *bar code* on the tin of dog food is *read* at the *POS terminal*. An itemised receipt is given to the customer. The *itemised receipt* has the *description* and *price* of the tin of dog food on it.

Describe the process by which the *description* and *price* of the tin of dog food appears on the *itemised receipt* after the bar code has been read. [3]

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- d) The supermarket uses the information *read* from the *bar code* for *stock control*.  
i) Explain how the *computer* knows the *number* of the tins of dog food *in stock*.  
ii) Explain how the *computer* knows when the *supermarket* should *order* more tins of dog food. [6]

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- e) All the goods sold by the supermarket have a record on the STOCK file. Write down, at least **six** fields you would expect to be in a record on the STOCK file.

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[3]

- f) The *supermarket on-line stock control system* using bar codes replaced a *manual system* using tills. When the *manual system* was used, the *price* of goods sold had to be *typed* into the till.

- i) Describe **two advantages** to the *supermarket* in using an on-line stock control system.

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- ii) Describe **one advantage** and **one disadvantage** to a customer when a supermarket uses an *on-line stock control system* using bar codes.

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- g) Describe **three** security precautions that the supermarket can take to make sure they do not lose any important data on STOCK. [3]

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