Application of Complete Bipartite Graph in Anti Theft Network

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Abstract: *In this paper application of graph theory in anti theft network is discussed. Also the implementation of complete bipartite graph in anti theft network is studied*

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1. Introduction

The graph theoretical ideas are used by various computer applications like data mining, image segmentation, clustering, image capturing, networking etc. Graph theory can be used to represent communication networks. A communications network is a collection of terminals, links and nodes which connect to enable telecommunication between users of the terminals. Each terminal in the network must have a unique address so that messages or connections can be routed to the correct recipients. The collection of addresses in the network is called the address space. Every communication network has three basic components: terminals(the starting and stopping points of network), processors(which provide data transmission control functions), transmission channels(which help in data transmission). The communication network aims to transmit packets of data between computers, telephones, processors or other devices. The term packet refers to some roughly fixed-size quantity of data, 256 bytes or 4096 bytes. The packets are transmitted from input to output through various switches.

The communication networks can be represented using the various mathematical structures which also help us to compare the various representations based on congestion, switch size and switch count. Graphs have an important application in modeling communications networks. Generally, vertices in graph represent terminals, processors and edges represent transmission channels like wires, fibers etc. through which the data flows. Thus, a data packet hops through the network from an input terminal, through a sequence of switches joined by directed edges, to an output terminal. Basic usage of barcode in shopping mall:

Places such as shopping mall, jewellery shops and super markets use bar code system which plays a very important role.

2. What is Barcode?

Barcode is an optical machine readable representation of data relating to the object to which it is attached. Originally barcodes systematically represents data by varying the widths and spacing's of parallel lines, and may be referred to as linear or one-dimensional.

Barcode is nothing but it's a number system. Every barcode has the numerically ordered numbers. It has the parallel lines that represents cost, quality, manufacturing date and expiry date.

3. What is a Scanner?

The earliest, and still the cheapest, barcode scanners are built from a fixed light and a single photosensor that is manually "scrubbed" across the barcode.

This scanner is attached with a computer. When particular item is scanned, the details about that particular item is displayed on the screen.
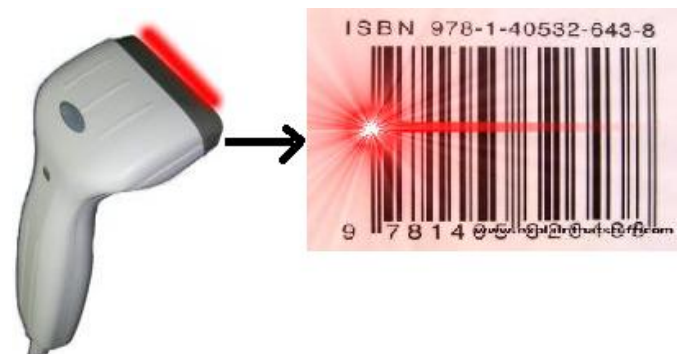

Scanning process: Automated

Automated scanner is one which is fixed at the exit of the particular mall, super market, etc., This completely works

using alarm signal. If an item is not billed or theft , then the automatic scanner scans the barcode automatically and the alarm rings.
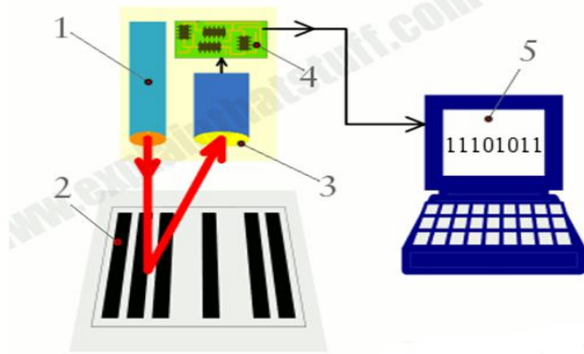
1 .Scanner
2. Bar code
3. Hard disk its contains items stock
4. Scanning process
5. Details of the item displayed in the monitor

The complete process is explained through the following circuit
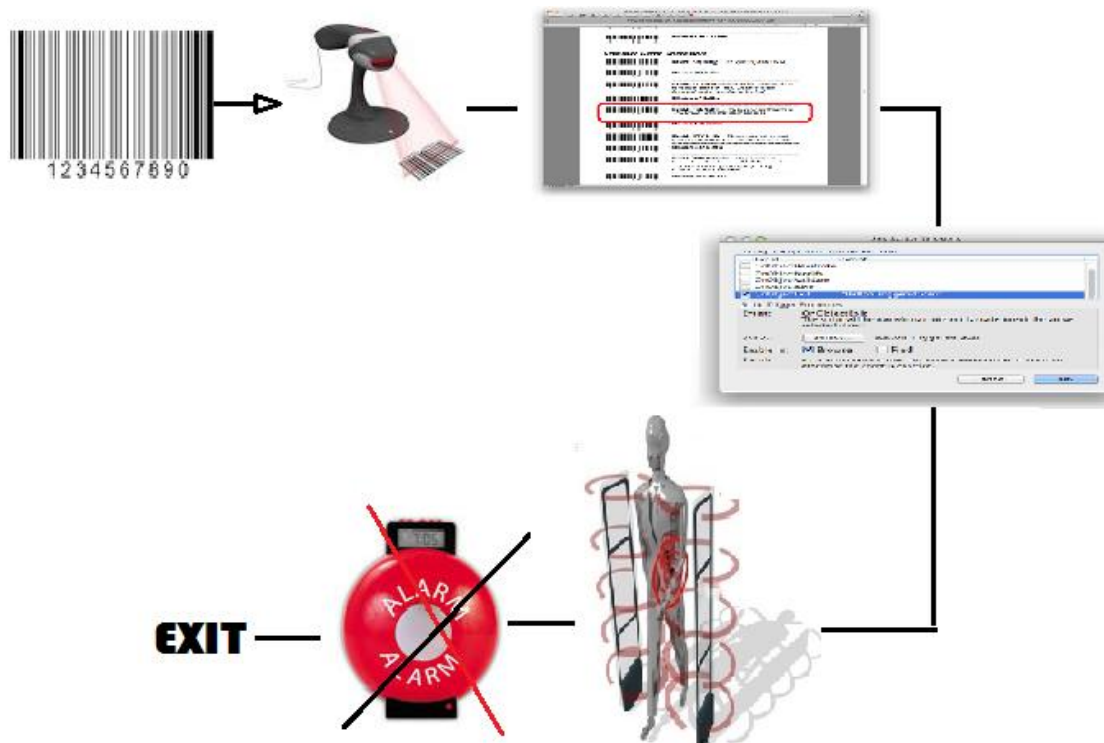
Now let us see how it is related with graph theory. For this we consider a complete bipartite graph.

4. Complete Bipartite Graph

A **complete bipartite graph** is a graph whose vertices can be partitioned into two subsets V_1 and V_2 such that no edge has both endpoints in the same subset, and every possible edge that could connect vertices in different subsets is part of the graph. That is, it is a bipartite graph (V_1, V_2, E) such that for every two vertices $v_1 \in V_1$ and $v_2 \in V_2$, v_1 and v_2 on edge in E.
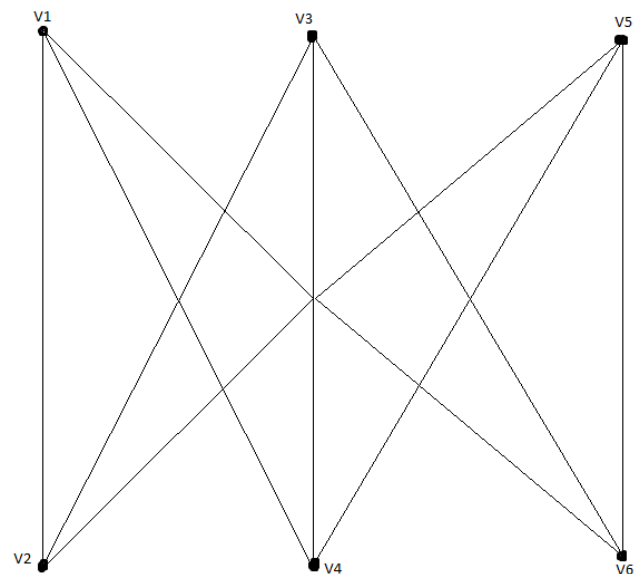
The complete bipartite graph can be used in anti theft controller. In this graph all the edges are signals and vertices

are signals transmitters. The signals travel through each and every edges.

Let v_1,v_2 can be represent the automatic scanner and item details which is linked with alarm and computer scanner. It has two options one is barcode neutralized system and another one is alarm of the system that are combo with one exit option. If we enter exit, both will be neutralized. The vertex v_3,v_4 represents the alarm. This alarm is connected with automatic scanner and billing scanner .When the item is scanned with the billing scanner then the alarm will be off or if the automatic scanner scans the item then the alarm rings. The vertex v_5,v_6 represent scanner with computer and also connected with automatic scanner and alarm. The pictorial representation of the process is given below.
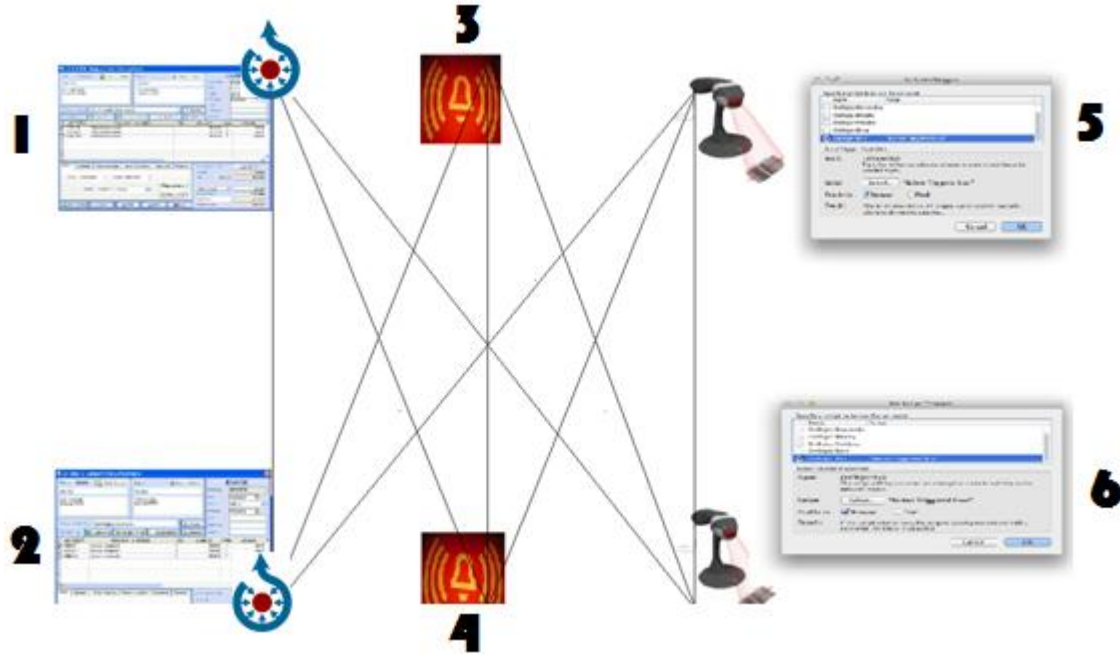
Here 1 &2 are the automatic scanner with item details(hard disk) 3 & 4 are the alarms and 5 & 6 are the Computer scanners.

5. Complete Process

In the first process the item is scanned and it recovers the details about the item from the hard disk which is then displayed on the screen. Now the billing can be done. After the billing process, a exit dialogue box opens that neutralize the alarm and barcode signals. Hence ,the alarm gets off.

Suppose, if an item is theft or left without billing then the scanner which is in the exit scans the item's barcode automatically. The scanned barcode signal is transmitted to the alarm which then rings. Now this alarm sends a signal to the computer which shows the particular theft item. Therefore, the theft item can be found out easily using the complete bipartite graph.

6. Conclusion

The bar code system is one of the best system which is used in anti theft networking, railways, shopping mall like departmental stores, textiles and also in the defence department so that the valuable things can be protected. It is the simplest method and the cost is very low compared to the other source in identifying theft.

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