

**TITLE PAGE**

**COMPUTER DESIGN OF PRICE INDICES AT ABUJA  
[CITY CENTRE]**

**BY**

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PGD/MCS/97/388**

**A Project submitted to Federal University of Technology  
Minna, Niger State; in partial fulfillment of an award of Post  
Graduate Diploma in Computer Science.**

# CERTIFICATION

I certify that this work was done by OLAJIDE OLASUNAKANMI RASHEED under my supervision in the department of mathematics and computer. Faculty of science and science Education Federal University of Technology, Minna, Nigeria.

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Date

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**EXTERNAL EXAMINER**

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Date

## DEDICATION

To my Mother, Ayisat Apinke Olajide and to the memory of my Father Akanbi  
Elemosho Olajide.

## ABSTRACT

This project has been designed to use computer program in calculating index numbers by an organization, company or individual who are engaging in forecasting price, quantity or value of an items in the market over a period of time. In other word, it is designed to show changes in variable or groups of related variable with respect to geographical location or other characteristics.

## ACKNOWLEDGEMENTS

So many people have contributed that it is impossible to thank all of them foremost, I give special thanks to Almighty Allah who in his infinite mercy make this possible for me. I want to extend my humblest thanks to Alhaji S.A. Olajide, Mr. G.O Olajide, Mrs T.N. Alao, and Mrs. R. Beiyioku.

My heartfelt thanks also goes to Professor K.R Adeboye, whose keen eye, calm demeanor, and seemingly infinite patience helped to sort out the wheat from the chaff. Special thanks also goes to my course coordinator Mr. Rasheed Badmus, all staff of Mathematics/Computer Science Department and all the staff of post graduate school. My appreciation for their collective ability to make a seemingly impossible schedule survivable.

Certainly not to be overlooked are my friends: Olufemi Olugbenga, Babatunde David, Titilope Yakubu, Samuel Ikesemi, Fatai Olajide, Wahaab Alao, Kayode Mayanbe, Lanre Oguntoye Akin Tella, Mufutau Maliq, Carolyne and finally my room mate Mufutau Jimoh.

And last but definitely not the least, many thanks to my shadow for putting up with human grouch.

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# CHAPTER ONE

## GENERAL INTRODUCTION

### 1.1 STATISTIC AND INDEX NUMBERS

Index number is a statistical verse used to measure changes in price, quantity or value of a group of related items over a period of time. In other words, it shows changes in variable or group of related variables with respect to time, geographical location or other characteristics such as income or profession. An index number is a single figure that shows how a whole set of related variable has changed over time or differs from place to place. For example a price index shows the overall change in a set of price, if we ask what has happened to price index over time. It is far more enlightening to reply that the price index has risen by 10%, rather than that the price of eggs is up 20%, the price of garri is down by 10% and so on.

Similarly, if we wish to compare the price of basket of tomatoes price index of F.C.T. and Ibadan, it is convenient to state that the tomatoes price index in F.C.T. is 2% than that of Ibadan rather than F.C.T. produces say 10% of the Ibadan.

### 1.2 CLASSIFICATION OF INDEX NUMBERS.

Index number could be classified into price, quantity and value indices. While price and quantity indices measure changes in price and quantity level of related item respectively, value index, on the other hand measures simultaneously changes in price of quantity item over a period of time.



### 1.3 TYPE OF INDEX NUMBERS

- 1) **Simple price relative index number** – This index measures change in price of individual item over the year. The indices could be obtain by dividing the price of each of the item by there corresponding prices in the base year. It is define as:-

$$SPR = \frac{P_{ni}}{P_{oi}} \times 100$$

Where  $P_{ni}$  = Current year price for item  $i$   
 $P_{oi}$  = Base year price for item  $i$

- 2) **Simple Price Index** - This index compares the sum of prices of an *item or* group of related items in the particular year with the sum of their price in the base year. It is define mathematically as -

$$SPT = \frac{\sum P_{ni}}{\sum P_{oi}} \times 100$$

Where  $P_{ni}$  and  $P_{oi}$  are as define in one  
 $\sum P_{ni}$  = sum of price of all items in period  
 $\sum P_{oi}$  = sum of prices of all items in the base year period.

- 3) **The Weighted Index Number**- The simple price index number assume that all items under consideration carry equal weight, this assumption in most cases is far from being correct as different quantities of items are produced from year to year in rectifying this wrong assumption therefore, the weighted price index number uses the respective quantities of the items in the base or the current year as weights. This weight play similar role as that play by frequencies

of a frequency distribution when determine its means. The weighted price index number can be classified into two –

- a) Laspeyres (Base Period Weights) define mathematically as :

$$\frac{\sum P_n Q_0}{\sum P_0 Q_0} \times 100$$

Where  $P_n$  = Price in a base year  
 $P_0$  = Price in a non base period  
 $Q_0$  = Quantity in a base period.

- b) Paasche (Current Period Weights) define as

$$\frac{\sum P_n Q_n}{\sum P_0 Q_n} \times 100$$

Where  $P_0$  = Price in a base period  
 $P_n$  = Price in a non base period  
 $Q_n$  = Quantity in a non base period.

- 4) **Fishers Ideal Price Index** – Sometime result obtained through laspeyres index are at variance with those obtained through paasche index, this is due to the fact that quantity and price of items change from year to year and at varying degrees, in other to strike a balance between the laspeyres and paasches weighted price indices therefore, Fishers use the geometric means of both. Hence, fishers' price index is define as:-

$$FPT = \sqrt{\left( \frac{\sum P_{ni} q_{oi}}{\sum P_{oi} q_{oi}} \right) \left( \frac{\sum P_{ni} q_{ni}}{\sum P_{oi} q_{ni}} \right)} \times 100$$

- 5) **The Cost Index** – So far, we have defined indices of quantity as well as price. It finally would seems appropriate to measure total cost of the consumers purchase.

$$PQ = \text{Item cost}$$

Therefore, for all Item, we have total cost

$$\text{Total cost} = \sum PQ$$

Cost index is define as follow:-

$$\text{Cost of index} = \frac{\Sigma P_n Q_n}{\Sigma P_0 Q_0} \times 100$$

#### 1.4 SCOPE OF COVERAGE

The retail price index is generally regarded as the barometer of the cost of living, since from its value the current rate of inflation can be calculated. It measures the monthly degrees of changes in the relative prices of goods and service over the old range of goods which household expended is expenditure. Therefore, the relative price index cannot be said to be a cost of living index since it coverage is restricted to the cost of the essential of life.

The purpose of this project would be based on measuring the changes in price of agriculture production over a period of time. It is a main indicator of agricultural activities in the country. The prices of selected food items are measured in tones for easy calculation and the period is a month. The monthly price index shall be calculated and the average of the price in the year shall be used to measure the changes in price index of the year. The past month price shall be used as base period. The selected food items used shall be common food items e.g. Rice, Garri, Maize and so on.

#### 1.5 PROBLEM OF COVERAGE

- a) It is designed to measure changes in the cost of living of an average household but in real life, very few families are exactly average.

- b) As pattern of consumer spending change so also do the items and weight in the index. This make it difficult to calculate.
- c) Many goods change in the design and quantity.
- d) The variety of price charge for many goods make it difficult to estimate the main price of an item.
- e) The level of the index may be arbitrary influence by change in individual taxes and subsidies.

#### 1.6 **OBJECTIVES OF STUDY**

- a) To help in comparing general price level in each month of the year.
- b) To determine if the increase in salary meets up with the changes in price of goods in the market.
- c) To help in easy calculation of price indices
- d) It facilitates the use of computer by the economist and the statisticians and those concern.
- e) To study and analyze the economic activities more especially the political and social structure within which it operates.

#### 1.7 **LIMITATION OF STUDY**

- a) Selection of base year
- b) Source of data
- c) Selection of items to be included in the index
- d) Choice of weights
- e) Problem of what and how to measure and why.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 REVIEW OF PAST PROJECT AND SAMPLE OPINION

In index number we always talk about so many things. We take into consideration all goods and services produce over a period of time and compare it with the production in another time to be able to know how the prices of goods are fluctuating in the market.

In the book titled “ Introductory Statistics for business and economics” by Thomas Wannacott and Ronald Wonnacott, published by John Willey and Sons in 1977. A statistician named Carroll Lewis [Ref: in his book Titled “Statistics History and Concepts”] is quoted when he was trying to describe how important the index number calculation is in economy. He said “ The time has come, to speak of many things, of shoes, ships and sealing wax, of cabbages - and kings” This man is trying to point out that when we are dealing with index number we consider all the products so as to know how the prices are doing in the market.

The two reference projects that would be considering in this project are one written by Kayode Sunday Meyanbe, [Ref: Titled “Statistical Analysis on consumer price indices”] in his parted fulfillment for the award of Bachelor of Science in Statistics, 1990 at Univrsity of Ilorin and the other one is by Dare Omotosho, [Ref: Titled “The Analysis of price index” in his partial fulfillment for the award of Higher National Diploma in Statistic of

the Federal Polytechnics, Bida, Niger state. Although, both talk extensively on construction and analysis of the index number. Both used different approach in reaching their conclusion.

Taken the first one written by Kayode Meyande, he used an unweighted aggregate index in constructing his indices. This could have been a good price index, however, this type of indices suffers a serious limitation because it is unduly influenced by the price variation of high -price commodities. The weight of the commodities consume is not taking into consideration. In this type of index changes in price is the arbitrary about changes in consumption pattern. Another draw back is the arbitrary nature of the units for which the prices are stated. For example if the of eggs were stated per half dozen rather than per dozen, the calculated price index figure would change. It is likely in this type of project that the indices would be dominated by the commodities that have high prices and it is likely that this type of commodities would be least purchased. The difficulties in converting a simple aggregative index into an economically meaningful measure make the need to apply explicit weight apparent.

Taken the second work by Dare Omotosho [Ref: Titled-Index Number Analysis], though, the weight is applied here but the arbitrary use of base year may make the work unpopular. In computing monthly indices, it is advisable to use the first month of the year as base period or any month that the price is more stable when dealing with the past years. It is generally assumed in the project that people do not move from one place to another. This assumption is wrong. Moreover, sample opinion conducted on Federal

Ministry of works and housing at Federal Capital Territory shows that, majority want to know how they expended their income, taking into consideration of all good and services they have been purchasing. They complain bitterly that the cost of living is very high. They want to know if their real income decreases or increases with changes in their real income decreases or increases with changes in their income. This has prompted us to design this project to calculate index at a view.

## 2.2 EFFECTS OF CALCULATING OF PRICE INDICES

In the construction of an index such as the CPI, consumers' price index the basic data on price are collected by experts who price goods for which detailed specifications have been made. The same items are always priced in the same store. However, as a result of technological and other improvement in the quality of commodities. It is difficult, as in many cases impossible, to make suitable adjustment in a price and index for quality change. Therefore, the information collected may be biased and this may have adverse effects on the people and it may reduce work location and distance from place of production is not taken into consideration, this may have adverse effect on the indices and the people will have wrong impression about prices at the same time. Moreover, it may have bad effects on the economy. People may not put in their best ability at work when it is realized that increase in salary is not meeting up with the prices of goods and services.

### **2.3 ECONOMICS IMPORTANCE**

Index Number series are widely used in connection with decision making and analysis in business and government. One of the best known applications of a price index is the use of the consumer price index CPI as an escalator in collective bargaining contracts. Much use is made of index number by individuals, companies as well as at the level of entire industries and the over all economy. In certain industries, it is standard practice to align changes in selling price to changes in indices of price of raw materials and wage earnings. Assessments of past trends and current status and projection of future economic activity are made on the basis of appropriate indices. Economists and statisticians follow many of the various indices in order to appraise the performance of the economy and to analyze its structure and behaviour.

### **2.4 PROBLEM ENCOUNTERED IN REVIEW OF RELEVANT LITERATURE.**

- a) Lack of current books
- b) High cost of existing literature
- c) Poor library system
- d) Data bank is poorly developed.



## CHAPTER THREE

### SYSTEM DESIGN AND ANALYSIS

#### 3.1 INTRODUCTION

In this chapter our concern will be on man-made system involving inputs processes and outputs. A system will be regarded as a set of interacting elements responding to input to produce an outputs then System Analysis can therefore be regarded as the method of determining how best to use computer with other resources to perform tasks which meet the information needs of an organization. The aims of this chapter are to analyze the work method and procedures in order to simplify work and to improve workflow and also to ensure that feasible alternative are produced. The strength and the weakness of the existing system will be analyzed in the chapter.

#### 3.2 ANALYSIS OF EXISTING SYSTEM

The following points shall stand as the criticism against the existing manual system. The existing system is carried out through regorous calculation every time a section of an index number is referred to. It does not accommodate large data and is not flexible. In terms of economics, the benefit derived from producing something should be related to the cost of producing them when dealing with large data, it costs more to generate an index figure when the existing system is used and it may discourage an organization in producing the index number. An organization requires mmediate information for meaningful action to be taken. The existing

manual system makes this difficult since it may take much time to produce the information needed by the organization.

### **3.3 APPROACH TO A NEW SYSTEM**

The desire for this new system is motivated by the wish to solve problem encountered in the existing system and to respond to directory. The program development of the index number construction presented in this project is achieved through the use of the modular and structured programmed concept. More precisely, the tope-down design technique is over whelmingly used. An idea of using this modular programming technique is as a result of the need to develop a very reliable system. Each module is treated in isolation both during coding testing and maintenance stage. Faults are easily located and corrections are made easily.

During the program design of the indices the outline of the computer program itself is formulated. In this stage the task are described in the way that can be easily converted into a computer program. This stage requires the breaking up of any complex task into smaller sub-task and exact limits in however, defined. Also processing requirements, system constraints i.e. execution time, response time and error handling method are specified.

### **3.4 OBJECTIVE OF PROPOSED SYSTEM**

The following objectives will be achieved by this proposed system as against the existing manual system.

- 1) Reliability
- 2) Purposeful

- 3) Economical
  - 4) Flexibility
  - 5) Principle of specialization, simplification and standardization
- will be achieved.

### 3.5 **HARDWARE AND SOFTWARE REQUIREMENT**

It is much important to give in detail the computing environments in which the indices presented is expected to work. This program can run on an IBM PC (Trade mark of the International Business Machines) and compatibles. The computer must have in it a minimum of an Intel 80286 microprocessor. A system with a Maths co-processor is vital. Very much important, the display monitor must be a colour monitor with a high resolution of up to 640 by 200 (16 colour) in the graphic mode. To run the program we require a Microsoft Quick Basic Compiler, or the usual Q-Basic computer supplied with recent versions of Microsoft Disk Operating System.

Microsoft Quick Basic is chosen as the language for programmers. It provides a lot of facilities to and during the course of programming. The compiler is able to automatically detect errors due to miss-typed variable named spelling, undeclared array, mistakes in sub-program and many more. The compiler also allows for rich selection of simple to use commands for the development of reliable software packages.

## CHAPTER FOUR

### SYSTEM DEVELOPMENT

#### 4.1 SYSTEMATIC TECHNIQUES FOR PROGRAMMING

While early programs were written in adhoc manner, modern programming practice dictates that they should be well organized and structured. Some of the principles that may be applied to achieve systematic programming may include the modular programming.

This is an early state in the development of structured program and one of the early attempts at improving programmers' productivity through better planning. In modules each of which performs a simple and limited function and is written and debugged separately from other modules. Because the purpose and size of each module are limited, the likelihood of making errors is reduced.

Each program contains a main module, which ultimately controls everything that happens. It therefore controls the sub-modules so that they may perform their function, but each sub-module return control to the main module when it has completed its task. If the task assigned to a sub-module is too complex, it must be broken down into other modules, which it control. The example of this will be seen in the program of this project. This process of successive sub-division of modules continues. This task can be input, output manipulating data, controlling other modules or some combination of these. A module may temporarily transfer control (branch) to another module, but each

module must eventually return control to the module from which it originally received control. In this project, modules are independent in the sense that no module can have direct access to any other module except its calling module, and its own sub-modules. However, the result produced by one module can be used by another when it is given control. Because the modules are independent and as such, different programmers can work simultaneously on different parts of the same program. This reduces the time that elapses between the beginning and completion of a program.

## 4.2 PROGRAM DEVELOPMENT

The task of writing a computer program involves going through several stages. Therefore, great care must be taken when writing a program to ensure that the computer, which uses the program, does what it is intended to do. The two points we would like to have in mind when creating programs are:

- a) We have already worked out for ourselves how the task should be done.
- b) We are clear in our mind exactly what we are trying to do.

How to deal with these two points forms the basis for the program development. Firstly, in the development of a program, program planning is the most essential. The planning stage is concerned with the formulation of the requirements that the task places on the computer. It also involves identifying and clearly understanding the program; identifying the input data and the required output information.

The program design stage is perhaps the most important because it outlines and defines the set of values required for the solution. It involves listing and ordering of successive steps. Once the steps of the solution has been ordered and outlined. Then, the next stage is the transformation of these steps to the form understandable by the computer. This is the coding stage. Debugging of program follow the coding stage closely. When coding and compiling programs, we may discover one or more bugs. The process of removing and even detecting of these bugs is called debugging. Moreover, program validation is important in program development. This is to determine whether any error still remains in program. This is done by using test data to test run the program and evaluate the program results. Finally, implementation and documentation of program is done by making the program fully operational and by describing the program in proper form for users to understand and to enhance maintainability.

#### 4.3 CHOICE OF PROGRAM

The choice of programming language is very important in program development. There are various types of programming languages that one can deal to write program with. The choice of any particular language depends on what we want to write the program on. It may be scientific, mathematical or even business problems' solving programming.

In this project, the programming language used is BASIC. BASIC is the acronym for Beginners all-purpose Symbolic Instruction Code. It was developed at Dartmouth College in 1963. Basic is high level language. It

is widely used in programming scientific, mathematical and business solving problems.

One argument for Basic is that it encourages running the computer in an interactive mode i.e. as soon as the users submits a program and some data to the computer, the computer executes it immediately and the results is produced. Availability on all Disk Operating System (DOS) is an important characteristic of BASIC. There are Basic Interpreters and Basic Compilers depending on the version of DOS used. And it must be noted that each version of Basic depends on the version of DOS. In this project all the Basic programs are supported by the Basic Compiler (Quick Basic) and can be tested in its environment.

#### 4.4 COMPARISON OF ALGORITHM TO PROGRAM

Because the two term may be used inter changeably in this project. It is better we distinguish them before the main program.

An Algorithm can be defined as a list (i.e. finite sequence) of instruction (each of which has a clear meaning), which can be carried out in a finite order, (with a finite amount of effort and time) to find the answer to a problem. The condition guarding development of an algorithm makes it clearly distinct from program. An algorithm lay more emphasis on precision than the program itself. Algorithm should have a finite number of instructions i.e. for all cases an algorithm should terminate after a finite number of steps. In an algorithm all instruction must be sufficiently basic

i.e. it is not enough that each operation must be definite but it must also be feasible (executable).

Program on the other hand is a sequence of instruction written in a specified computer language. A program does not necessarily satisfy finiteness condition as it is in algorithm and the program may also not have terminal end. Finally, as algorithm is independent of any programming language, program depends on programming language used. This project makes use of BASIC programming language and supported by Quick Basic Compiler.

#### **4.5 OBJECTIVES OF SYSTEM DEVELOPMENT**

- a) It helps to describe the plan of the study.
- b) It gives the framework for the treating of collated data, the computer techniques to be employed and how they will be applied to the question.
- c) It provides a general structure of the research design within which the research work is to be carried out.
- d) It considers the variables to be employed in the research work.



## **CHAPTER FIVE**

### **DOCUMENTATION**

#### **5.1 IMPLEMENTATION**

This is the process of coding, testing and documentation of program. Once the steps of the solution to a problem has been ordered and outlined, then the next stage is the transformation of those steps to the form understandable by the computer. Implementation of the design involves making the program fully operational i.e. applying the program to solve series of related problem. This is clearly shown in the appendix.

#### **5.2 GENERAL SYSTEM REVIEW**

The general correctness of the system program will be duly considered here. Once the objectives of the program have been achieved, the next stage is to see that the program actually does those things correctly for all cases. The system should be able to work for all cases, making sure it works with full range of numbers (data) that the users may likely require.

The primary resources used by a computer program are the user's working time, the computer disk space etc. A good system minimizes the use of each of these resources while accomplishing the program objectives. The cost – effectiveness, this involves the comparison of the social cost benefit analysis using a particular system alternatives. All these is reviewed in the system program plus how friendly the system is to the users.

### 5.3 CONCLUSION

Series of index number are extremely useful in the study and analysis of economic activities. Every economy, regardless of the political and social structure within which it operates, is engaged in the production, distribution and consumption of goods and services convenient method of aggregation averaging, and approximation one required to summarize the myriad individual activities and transaction. Index number have proved to be very useful tools in this connection. Thus we find indices of industrial production, agricultural production, stock market prices, whole sale prices, consumer prices, prices of export and import, income of various types and so on in common use.

Our modality is on greater reliance and accuracy in designing the system. Therefore, some of the problem tested with program have given out accurate and reliable result.

Most individual, organization and companies that are engaging in focasting do not depend on any single method but rather utilize a variety of different approaches. It stands to reason that if there is substantial agreement amongst a number of forecasting arrived at by relatively dependent methods, greater reliance would be placed on this consensus than would have been placed on the result of any single technique. However, with high degree of reliance, accuracy, speed achieved by the method of this project. The method would be recommended in calculating indices in organizations and companies.

**PRICES OF SELECTED FOOD ITEMS (PER TONE) IN NAIRA  
{QUANTITY PURCHASED UNDER EACH PRICES}**

**APPENDIX B**

S/No	Food Items in tone	Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Aver.
1	Garri	1870	1720	1650	1620	1528	1489	1417	1330	1497	1340	1518	1269	5097.58
		3760	3740	4250	5620	5830	6040	6480	6070	5921	6020	5180	6940	
2	Ground nut (Shelled)	1270	1257	1170	1024	1122	1080	997	978	1010	1032	1114	1060	11168.85
		9750	9870	9680	11470	11980	11800	14292	14442	10965	12850	12410	12800	
3	Ground nut (unshelled)	3879	7981	3651	6724	3445	3081	4117	4881	4312	3146	4181	7008	5092.77
		5470	3570	5110	5960	5940	4200	4310	4270	4330	4820	6460	5480	
4	Maize	7703	6067	6007	5400	5319	4802	4812	4919	4879	5512	5412	5371	4882.85
		3260	3370	3690	4280	5270	7820	7770	6120	6660	5430	5050	4380	
5	Millet	2714	2610	2556	2417	2300	2316	2208	2080	1918	2008	1986	2122	6318.70
		3040	3260	3630	3880	5180	5050	6760	8300	8873	7090	8130	6630	
6	Milled Rice	9870	9787	4693	9517	8998	8819	8816	87709	8678	8977	9094	9000	16801.66
		12630	12720	14520	14470	16900	18000	18780	19440	19900	18120	15510	17460	
7	Paddy Rice	10016	9870	9810	7720	9700	9762	9810	9706	9734	9770	9916	9987	8644.95
		6140	6410	7370	8210	9970	9600	8500	9610	9690	9530	8740	8480	
8	Palm Oil	6740	6760	6673	4275	4178	4256	5617	5812	5719	6119	1012	1000	13868.85
		10330	10262	10270	12590	14560	10000	11740	12200	12483	11960	19980	25270	
9	Groundnut oil	8837	8003	7009	7060	6067	5319	5400	5967	5770	5472	5317	4111	19628.91
		18460	18810	19940	19830	21010	21520	20120	19820	19830	20130	24090	38070	
10	Guinea Corn	6840	6756	5900	5991	4331	3274	3100	3418	2167	3008	3216	3916	5896.25
		2780	2900	3080	3160	4390	6700	6660	6420	7283	6840	6840	5018	

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1 *** COMPUTER PROGRAM FOR AN INDEX NUMBER SERIES ***
1 *** PGD COMPUTER SCIENCE PROJECT ***
1 *** BY OLAJIDE OLASUNKANMI RASHEED PGD/MCS/97/388 ***
1 *** INDEX NUMBER SERIES ***
INT "WHAT TYPE OF INDEX DO YOU REQUIRED?"
INT "1 SIMPLE PRICE RELATION INDEX"
INT "2 SIMPLE PRICE INDEX"
INT "3 LASPEYRES INDEX"
INT "4 PAASCHE INDEX"
RINT "5 FISHERS INDEX"
RINT "6 COST INDEX"
RINT "7 NONE"
NPUT "TYPE CODE 1-7", C
N C GOTO 150
EM***SUBROUTINE INDEX
F A$ = "1 SIMPLE PRICE RELATION INDEX" THEN
OSUB 190
ETURN
EM *** SPRINDEX
LSE
F A$ = "2 SIMPLE PRICE INDEX" THEN
OSUB 225
ETURN
EM***SPINDEX
ELSE
F A$ = "3 LASPEYRES INDEX " THEN
OSUB 255
ETURN
EM***LASPEYRESINDEX
ELSE
IF A$ = "4 PAASCHE INDEX" THEN
OSUB 285
RETURN
EM***PAASCHEINDEX
ELSE
IF A$ = "5 FISHERS INDEX" THEN
OSUB 315
RETURN
EM***FISHERSINDEX
ELSE
IF A$ = "6 COST INDEX" THEN
GOSUB 345
RETURN
EM***COSTINDEX
ELSE
PRINT "INVALID INDEX"
END IF
END IF
END IF
END IF
END IF
END IF
STOP

0 SUB COSTINDEX
0 COUNTER = 1
0 PRINT "CURRENT YEAR PRICE FOR ITEM"; Pn

```

```

PRINT "CURRENT YEAR QUANTITY FOR ITEM"; Qn
PRINT "BASE YEAR PRICE FOR ITEM"; Po
PRINT "BASE YEAR QUANTITY FOR ITEM"; Qo
PRINT Pn
DIM n(50)
FOR k = 1 TO 49
READ n(k)
NEXT k
INPUT Qn
DIM n(50)
FOR j = 1 TO 49
READ n(j)
NEXT j
DIM sum(50)
PnQnsum = sum(Pn * Qn)
INPUT Po
DIM o(50)
FOR r = 1 TO 49
READ o(r)
NEXT r
INPUT Qo
DIM o(50)
FOR m = 1 TO 49
READ o(m)
NEXT m
PoQosum = sum(Po * Qo)
LOCATE 40, 75
PRINT "MORE DATA Y/N"
IF A$ = "Y" THEN
GOTO 2360
END IF
IF A$ = "N" THEN
GOTO 2670
END IF
COSIND = (PnQnsum / PoQosum) * 100
END SUB

```

```

SUB FISHERSINDEX
COUNTER = 1
PRINT "CURRENT YEAR PRICE FOR ITEM"; Pn
PRINT "BASE YEAR QUANTITY FOR ITEM"; Qo
PRINT "BASE YEAR PRICE FOR ITEM"; Po
PRINT "CURRENT YEAR QUANTITY FOR ITEM"; Qn
INPUT Pn
DIM n(50)
FOR k = 1 TO 49
READ n(k)
NEXT k
INPUT Qo
DIM o(50)
FOR m = 1 TO 49
READ o(m)
NEXT m
DIM sum(50)
PnQosum = sum(Pn * Qo)
INPUT Po
DIM o(50)
FOR r = 1 TO 49
READ o(r)
NEXT r

```

```

oQosum = sum(Po * Qo)
INPUT Qn
DIM n(50)
FOR j = 1 TO 49
  READ n(j)
NEXT j
PnQnsum = sum(Pn * Qn)
PoQnsum = sum(Po * Qn)
LOCATE 35, 70
PRINT "MORE DATA Y/N"
IF A$ = "Y" THEN
  GOTO 1860
END IF
IF A$ = "N" THEN
  GOTO 2280
END IF
FISHIND = ((PnQosum / PoQosum) * (PnQnsum / PoQnsum)) ^ 1 / 2 * 100
JB

```

#### SUB LASPEYRESINDEX

```

COUNTER = 1
PRINT "CURRENT YEAR PRICE FOR ITEM"; Pn
PRINT "BASE YEAR QUANTITY FOR ITEM"; Qo
PRINT "BASE YEAR PRICE FOR ITEM"; Po
INPUT Pn
DIM n(50)
FOR k = 1 TO 49
  READ n(k)
NEXT k
INPUT Qo
DIM o(50)
FOR r = 1 TO 49
  READ o(r)
NEXT r
DIM sum(50)
PnQosum = sum(Pn * Qo)
INPUT Po
DIM o(50)
FOR m = 1 TO 49
  READ o(m)
NEXT m
PoQosum = sum(Po * Qo)
LOCATE 25, 60
) PRINT "MORE DATA Y/N"
) IF A$ = "Y" THEN
) GOTO 1050
) END IF
  IF A$ = "N" THEN
    GOTO 1310
  END IF
) LOPYIND = (PnQosum / PoQosum) * 100
SUB

```

#### 0 SUB PAASCHEINDEX

```

0 COUNTER = 1
0 PRINT "CURRENT YEAR PRICE FOR ITEM"; Pn
0 PRINT "CURRENT YEAR QUANTITY FOR ITEM"; Qn
0 PRINT "BASE YEAR PRICE FOR ITEM"; Po
0 INPUT Pn
0 DIM n(50)

```

```

OR k = 1 TO 49
  READ n(k)
NEXT k
INPUT Qn
DIM n(50)
FOR j = 1 TO 49
  READ n(j)
NEXT j
DIM sum(50)
PnQnsum = sum(Pn * Qn)
INPUT Po
DIM o(50)
FOR r = 1 TO 49
  READ o(r)
NEXT r
PoQnsum = sum(Po * Qn)
LOCATE 30, 65
PRINT "MORE DATA Y/N"
IF A$ = "Y" THEN
  GOTO 1450
END IF
IF A$ = "N" THEN
  GOTO 1730
END IF
PAASIND = (PnQnsum / PoQnsum) * 100
END SUB

```

```

UB SPINDEX
COUNTER = 1
PRINT "CURRENT YEAR PRICE FOR ITEM"; Pn; COUNTER;
PRINT "BASE YEAR PRICE FOR ITEM"; Po; COUNTER;
INPUT Pn
DIM n(50)
FOR k = 1 TO 49
  READ n(k)
NEXT k
Pnsum = Pnsum + Pn
INPUT Po
DIM o(50)
FOR r = 1 TO 49
  READ o(r)
NEXT r
Posum = Posum + Po
LOCATE 20, 60
PRINT "MORE DATA Y/N"
IF A$ = "Y" THEN
  GOTO 740
END IF
IF A$ = "N" THEN
  GOTO 940
END IF
SPI = (Pnsum / Posum) * 100
END SUB

```

```

SUB SPRINDEX
COUNTER = 1
INPUT "CURRENT YEAR PRICE"; Pn
INPUT "BASE YEAR PRICE"; Po
INPUT Pn
DIM n(50)

```

```
JB SPRINDEX
UNTER = 1
INPUT "CURRENT YEAR PRICE"; Pn
INPUT "BASE YEAR PRICE"; Po
JPUT Pn
IM n(50)
)R k = 1 TO 49
)AD n(k)
)XT k
JPUT Po
IM o(50)
)R r = 1 TO 49
)AD o(r)
)XT r
)R = (Pn / Po) * 100
JB
```



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