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Microprocessor Design Using COPRAS Method

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Abstract. *Introduction: A microprocessor is a computer and An important part of the structure, Without it, on your computer, Nothing can be done. it is a programmable device, It does some arithmetic on the input and logical operations and the desired output creates. In simple words, Microprocessor is on a chip It is a digital device Instructions from memory. Get them and decode them can run and give results. Fundamentals of Microprocessor. In a microprocessor machine language Take some steps that activate them, to the processor That's what it should do says Microprocessor instruction Three basics when implementing Doing things: Its addition, Subtraction, multiplication, division, and some logic functions Arithmetic and Logic Unit (ALU) makes use of. New Microprocessors are floating point Functions in numbers are doing In microprocessors The data in is from one location Can be moved to another location. It is a Program Counter (PC). Contains the registry, which Based on the value of the system address of the next instruction Stores, the microprocessor from place to place Jumps and makes decisions.Research significance: For microprocessor design, this Description Various semiconductors In device fabrication processes Made using some, Consequently in a chip carrier A drop in binding occurs. This chip carrier is then printed. Solder on the circuit board (PCB). done or in the socket is inserted. New microprocessor or microcontroller unit, To make the process flow logically Some general steps can be followed. These few steps make it even easier for small manageable tasks can be separated. A new microprocessor General steps for designing. A must-have in the new app is the determination of skills. required Data path to handle capabilities Set up. Machine code Instructional Design (ISA) Define. data path Create the necessary logic to control.Methodology: An analysis of the COPRAS method in this complex proportionality assessment (COPRAS) system in 1994 showed that the index values used to assess the Gavaskar, Kalkaska, and sarka introduced at this time increased and decreased. Alternatives: Poor life recycled products market, poor consumer perception of recycled products, poor supplier commitment, the poor success of curbside pickup. Evaluation Option: Finance Team, Engagement / Support, Infrastructure Team, Knowledge Team, Environment Team.Alternative: CISC is Intel 386, Intel 486, Pentium, EPIC is IA-64, DEC Alpha 21164. Evaluation preference: Feature size (micron), Supply voltage (V), Die size (mm2), DRAM bits/chip (m).Results: from the result, it is seen that CISC Intel 386 is got the first rank whereas DEC Alpha 21164 is having the lowest rank.*

Keywords: *CISC Intel 386, DEC Alpha 21164, COPRAS*

1. INTRODUCTION

Efficiency and area and microprocessor design the main driving forces are, But recently portable The explosion in electronics Development is this design More power on upgrades Towards sensible solutions Forced to change. Desktop units and For large computing machines Also, the heat generated Cost of disposal and "greenness" Drive towards computers are for power reduction Prioritize [1]. For the last 30 years, the process technology is mainly microprocessor Runs designs. The Semiconductor Industry Association (SIA) of process technology Continuously presents progress. These predictions are the basis and assumptions for new chip designs that have changed. 2 for semiconductors As an international technical map Officially released, These predictions are usually SIA are called road maps [2]. Improved microprocessor Performance is mostly technical Resulting from measurement, which Designers watch more of integration in frequencies Helps increase size. Current implementations are 0.25 Micron feature sizes Although used, the next few 0.1 microns over the years with fewer feature sizes Devices are expected [3].Reliable microprocessor design Challenges to overcome to create Big ones. Multiple sources of errors are, in each design, During validation and production Pay careful attention. which can reduce reliability Mistakes we three We divide them into categories. Design Mistakes, manufacturing defects, and functional impairments [4]. Transistor budgets Ever expanding, Microprocessor Architects New and to increase efficiency Their sophisticated methods Integrate seamlessly into designs are coming This is complicated To cope with the increase, successful App validation attempts, are acceptable in the

final product Scale functionality A variety of fillers to achieve Verification techniques should be used [5]. Microprocessor design is A discipline and an art. Embedded in Intel's 4004 Consisting of 2108 transistors The first microprocessor was in 1971 Since its introduction, The complexity of the design is twofold Trancy is over a billion A contemporary multi-core with stars Multiple orders with apps has increased. However, Microprocessor design is still the Inspiration of the people involved, Driven by passion and vision [6]. Microprocessor designed 0.18-m Process technology Millions on a chip using 0.10-m from the transistors and subtle process Using technologies approx. Up to billions of transistors While advancing, the microprocessor The designer is unprecedented In terms of electronic design Automation (EDA) challenges facing microprocessors future generations [7]. General-purpose microprocessor Designs energy dissipation A difficult task to reduce Because face Energy dissipation is soon the future As a barrier to technologies changes. In portable systems Extending battery life Besides, reliability To improve, more In efficient systems Heat removal cost To reduce power consumption Reducing is important [8]. CLOCK gating is digital Power dissipation in circuits A great one to reduce through A general In the synchronous circuit, A general-purpose microprocessor, Only part of the circuit is Active at any time. Recently, system-on-a-chip (SoC) design is popular [9]. Functional verification is today's Key in chip design One of the challenges is testing Development, test bench Construction and simulation are of the design effort Consume a significant portion. Throughout the 1990s, formal Validation routine simulation For based validation A promising Emerged as filler [10]. Performance of COAL To prove, a general Superscalar microprocessor Explore design space We conduct extensive tests. Training design frameworks Same for achieving labels Simulation budget Given, COAL is the modern Mean square of ANN DSE technique Error can be reduced by 35-95% Tests show that. Also, it rains on a pure bed Semi-supervised learning and pure with active learning approaches Compared, coal is better To achieve prediction accuracy Prove that it can We also conduct tests, This is the COAL approach Further proving superiority [11]. This configuration is HC-DRO(High Efficiency-DRO) as we call it. In current microprocessor designs How HC-DRO can be incorporated As an illustration of that, branch HC-DRO to save history A single column of cells 2-bit branch using We shape the forecast. HC-DRO to save content A log file that uses cells We design the structure. HC-DRO is a traditional tube How to design a microprocessor that can be integrated These two are to show The purpose of the demonstrations [12].Compared to other jobs Less than microprocessor design Clock cycles are required. Additionally, the Memory requirements of the microprocessor are relatively small, It only supports AES. presented in Table 3 achieved in performance is very high. The cost per area is considerable There is more because we are We execute an app and improving energy We aim to At the same time the tasks area and improving power are aimed at [13]. Advanced design approaches Some may argue that is the only requirement However, VLSI students In designing at the mask level Must have experience That's what our teachers felt strongly. Experience are Library design, pitch matching, Layout Styles, Transistor Magnitude, and Area-Velocity-Power Knowledge of exchanges Get, it's integral To the circuit designer's Basic background [14]. More devices on a chip The more integrated, the more powerful microprocessor And for package design Temperature is the main concern has Thermal management and Related design issues, Semiconductor Industries Through the Association Roadmap, of the industry over the next decade Planned performance Five key to achieving goals Continue to be one of the challenges are identified [15]. Each continuous technique formulation, process, and Environmental variables Microprocessor A proliferation of design envelopes A large part of the method is using Today's Microprocessors raw circuit Apart from performance, power consumption, Process variation, cooling Capacity, and long term Device reliability are defined by [16]. Microprocessor and Microcontroller Complexity is usually formal or Semi-formal techniques or Straightforward balance checking Blocks the application. Accurate Approaches are specific areas or simplified Successfully used in high-end models, but They are RT-level descriptors Rarely suitable for completion [17]. ADAS stands for microprocessor design Application-oriented design automation is the system. The objective of ADAS is to automatically explore the design space, In a subset of standard Prolog A written instruction set High-level of Architecture (EA). Single-chip from spec A VLSI processor must be integrated [18]. Structure and Synthesis Microprocessor design in stages. The current behavior is thermal with modeling algorithms compared, proposed The method is the training data Commonly used Transient power and temperature Smaller than the waveforms Models can be created. Such an approach is pre-existing than the modeling process Very easy and creates fewer constraints, Thus, the practice is measured as A good fit for the data [19].

2. MATERIALS & METHODS

2.1. Alternative: CISC are Intel 386, Intel 486, Pentium, EPIC is IA-64, DEC Alpha 21164.

2.2. CISC is Intel 386: Intel 386, originally 80386 Published and later i386 was renamed in 1985 and Introduced a 32-bit microprocessor. First editions had 275,000 transistors, More workstations and It is the CPU of high-end personal computers.

2.3 Intel 486: Intel 486, officially i486 Also known as 80486, is a microprocessor. This is Following the Intel 386 High performance. The i486 was introduced in 1989. This is from 1978, 8086, 1982's Intel 80286, and Binary following 1985's i386 Fourth of compatible CPUs represents a generation.

2.4. Pentium: Pentium is from Intel Corporation A widely used individual computer is a microprocessor. In 1993 First issued in
Pentium, Intel's 486 Microprocessor, personal computer A microchip in the making Made it an off-choice.
2.5. EPIC is IA-64: IA-64 128-bit packets Use it as a template As three IA-64 mechanisms are Organized. In the template Presented to the host app Information is available. The template Contains the following information: Any Instructions can be run in parallel And any instructions It should be implemented continuously.
2.6. DEC Alpha 21164: Alpha 21164, its symbol Also known as EV5, is the alpha instruction set Implemented architecture By Digital Equipment Corporation created and fabricated is a microprocessor. It's January Introduced in 1995, Digital after Alpha 21064A was the primary microprocessor.
2.7. Evaluation preference: Feature size (micron), Supply voltage (V), Die size (mm2), DRAM bits/chip (m).
2.8. Feature size (micron): Micron Technology is an It is a semiconductor company Memory and storage solutions Create and creates. Micron Products Automobiles, Consumer Electronics, Information Communication devices, servers and Used in computers. Its computing and networking Business Unit Revenue and Largest operating income Create a role.
2.9. Supply voltage (V): The supply voltage is Customer-oriented service The entry will be measured in equipment The voltage is usually 750 Below volts. Voltage is from the power source of the circuit It is the stress that comes from the electric current passes current through, It's like a flashing light that Helps to do the work. In short, voltage = pressure, It is measured in volts (V).
2.10. Die size (mm2): In electronics, a wafer is a slice or substrate Also known as such as crystalline silicon (c-Si). is a thin semiconductor, It is integrated circuits To generate, in photovoltaic's, Manufacture of solar cells Also used for making Scale and on it Built-in microelectronics As a substrate for devices works. It is a stimulant, ion implantation, etching, thinning of various materials Image Deposition Photography Designing and many more Micro fabrication undergoing processes.
2.11. DRAM bits/chip: Dynamic Random Access Memory (DRAM) is a type of semiconductor memory, which is usually used for data or program code that a computer processor needs to function. DRAM is a common type of random access memory (RAM) used in personal computers (PCs), workstations, and servers.

Complex Proportionality Assessment (**COPRAS) Method:** Complex proportionality assessment (COPRAS) the weighted mean and geometric integration operators integrate the pifss information. Then, to solve the decision problems COPRAS and integration operators basically two algorithms we create. +e COPRAS method zavadskas and introduced by many. Every compare alternative and benchmark weights taking into account their calculating priorities. In all such methods, to rank the given alternatives one of the most suitable methods COPRAS is and quantity and broadly to qualitative analysis is used. +e direct and proportional dependence of the COPRAS method weights and study on the structure of criteria use of adaptations made considers size. COPRAS method is engineering problems in computation time means less, more basic, good a comparative analysis of methods transparency and their graphical about co-strategies greater possibilities of understanding indicates. Hajiaka et al in literature, various of cobras method in fuzzy environment there are many applications [20]. To enhance the evaluation efficiency of COPRAS, stochastic COPRAS (COPRAS-s) stochastic decision making named as complex using process proportionality rating (COPRAS) approach. In the COPRAS-s, scale significance performance of weights and alternatives a fixed number of values decision maker (dm) estimates minimum and maximum from a uniform distribution over a range of values by generating random numbers determined. Thus, the number of experts increased and different opinions because of the incorporation, the decision-making process done effectively. Additionally, with ambiguity at the end the resulting randomness is modeled in this manner.a unique normalization based on wellknown deviation the method is likewise implemented in COPRAS-s. In this manner, the cost and advantage category criteria are evaluated in a exclusive way. This proposed for cobras a practical and powerful tool [21].

Among these methods, cobras recent attracted more inquiries. As a compromise method, cobras method is better rate of settlement and worse of the ratio for the best solution basically determines a solution. Unlike other madm methods, the copras method is step-by-step dependent on rankings and reasoning importance to make selection and both application degrees uses. Chatterjee et al conducted comparative analysis, ahp, others like vikor and topsis compared to methods, copras-based the technique requires less evaluation time, very straight forward and graphical explanation also shows high reliability. In literature, cobras have many uses [22]. The COPRAS method is an MCDM approach, it changed into delivered through zavadskas et al. This method is a fine-ideal answer and one associated with the terrible-perfect answer determines the solution, consequently a compromise mcdm method can be considered. First, the COPRAS system under deterministic conditions created for decision making. Uncertainty in decision making is a as an inevitable feature, of cobras method in this study an extended form is proposed [23]. This section focuses on a new extension to the cobras method popular under phfs

environment delivery. Origin of cobras method is mcdm led to increased use of copras in javadskas et al. Cobras method selected for the project using residential appliances. Zavatskas and many others. In an environment of uncertainty combined grey-cobras contractors rated with approach. Korabe et al. The copras approach using industrial robots a formal selection was made. Yastani et al. Green suppliers qfd and copras for evaluation with integrated model created by zheng et al. For reluctant linguistic preferences by using copras assessment of severity of lung disease did vahdani et al. Gap with the COPRAS approach valued in an ambiguous context robot. Mousavi et al. Comparison with other mcdm methods for selection of auxiliary equipment by performance of the COPRAS approach researched. Chatterjee et al [24]. Theoretically sustainable eligibility of city cell for small city to evaluate, several criteria complex proportions with of assessment system (COPRAS) application is provided. the parameters efficient calculation and city of visualizing the abstract for purpose this time geography linked to information system [25]. COPRAS method of information can be processed from different angles. Exacerbation in copraspatients indicators for assessment, the more they have values, patients better body status and price standards, the better the values they've, the poor bodily situation of sufferers which might be divided into benefit standards. Similarly, the cobras system is complex based on proportional calculation considering two criteria, this is much compared to other methods contains accurate information, the handling is cost criterion or this is a measure of goodness [26]. To achieve the ranking of alternatives, the value of each attribute should also contain their values and operational requirements to evaluate alternative to complement a decision-making process should be used. Available attribute data size or can be qualitative. Contradictory decision making is influenced by criteria to solve a selection trouble in situations madm approach COPRAS is useful. Here, the situation of device selection COPRAS explained and up to date ranking is executed by method. Using the proposed method the rank received is very found to be reliable [27]. Introduction to Mcdm problems an integrated intuition fuzzy cobras (IF-COPRAS) method, an extension of the classical COPRAS method. In this manuscript, known as if-COPRAS method many with intuitively ambiguous information criteria decision making (Mcdm) difficulty solving problems we use the proportional assessment (COPRAS) method we provide in this manner, a to estimate scale weights a new formula has been developed, in which objective weights are from a different measurement system are calculated. For this, the new parameter difference and entropy measures there are some desirable ones that have been explored properties are also discussed [20]. Complex proportionality assessment (COPRAS) by coefficient of gray number (COPRAS-g) methods complex proportionality assessment material selection using this article attempts to address the issues, different at the same time subject selection criteria and considering their relative importance takes these two methods rankings obtained using the past almost with those obtained by the researchers confirm. Of accepted methods feasibility and applicability two cases to prove time examples are illustrated [28].

3. RESULT AND DISCUSSION

TABLE 1. Microprocessor Design

	DATA SET			
	Feature size (micron)	**Supply voltage (V)**	**Die size (mm2)**	**DRAM bits/chip (m)**
CISC are Intel 386	0.25	1.80	300.00	1.07
Intel 486	0.18	1.90	340.00	1.70
Pentium	0.15	2.10	620.00	4.29
EPIC is IA-64	0.13	2.80	750.00	68.70
DEC Alpha 21164	0.17	3.00	910.00	275.00

Table 1 shows the Microprocessor Design using COPRAS method for Alternative: CISC are Intel 386, Intel 486, Pentium, EPIC is IA-64, DEC Alpha 21164. Evaluation preference: Feature size (micron), Supply voltage (V), Die size (mm2), DRAM bits/chip (m).

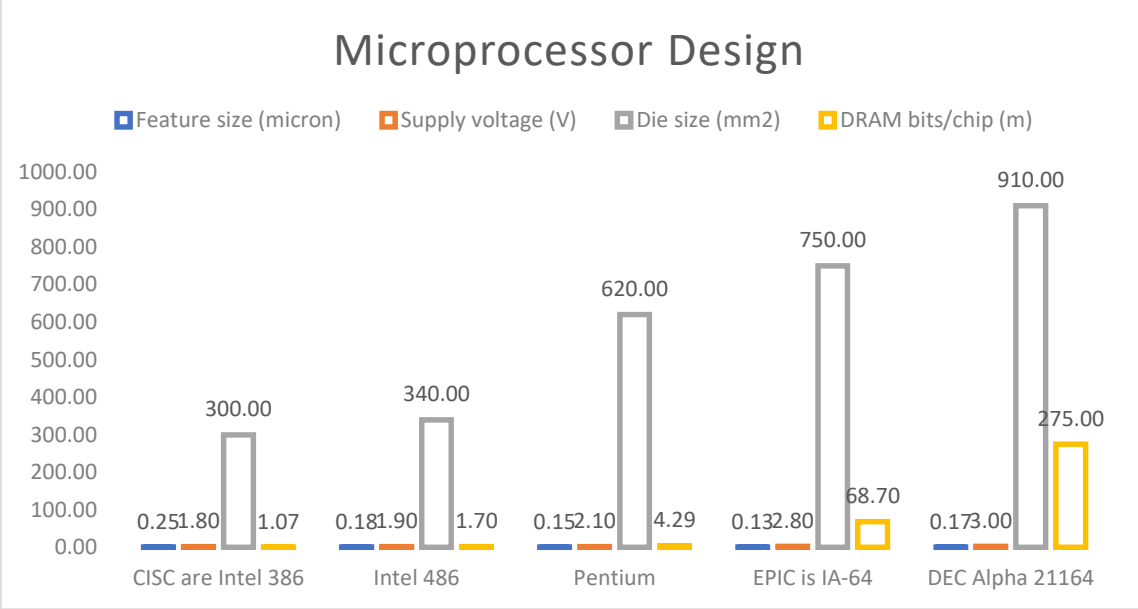

FIGURE 1. Microprocessor Design

Figure 1.shows the graphical representation Microprocessor Design Feature size (micron) it is seen that CISC are Intel 386 is showing the highest value for EPIC is IA-64 is showing the lowest value. Supply voltage (V) it is seen that DEC Alpha 21164 is showing the highest value for CISC are Intel 386 is showing the lowest value. Die size (mm2) it is seen that DEC Alpha 21164 is showing the highest value for CISC are Intel 386 is showing the lowest value. DRAM bits/chip (m) it is seen that DEC Alpha 21164 is showing the highest value for CISC are Intel 386 is showing the lowest value.

TABLE 2. Normalized Data

Normalized Data			
Feature size (micron)	**Supply voltage (V)**	**Die size (mm2)**	**DRAM bits/chip**
0.2841	0.1552	0.1027	0.0031
0.2045	0.1638	0.1164	0.0048
0.1705	0.1810	0.2123	0.0122
0.1477	0.2414	0.2568	0.1959
0.1932	0.2586	0.3116	0.7840

Table 2 shows the normalized data which is calculated from the data set each value is calculated by the same value on the table 1. Microprocessor Design divided by the sum of the column of the above tabulation.

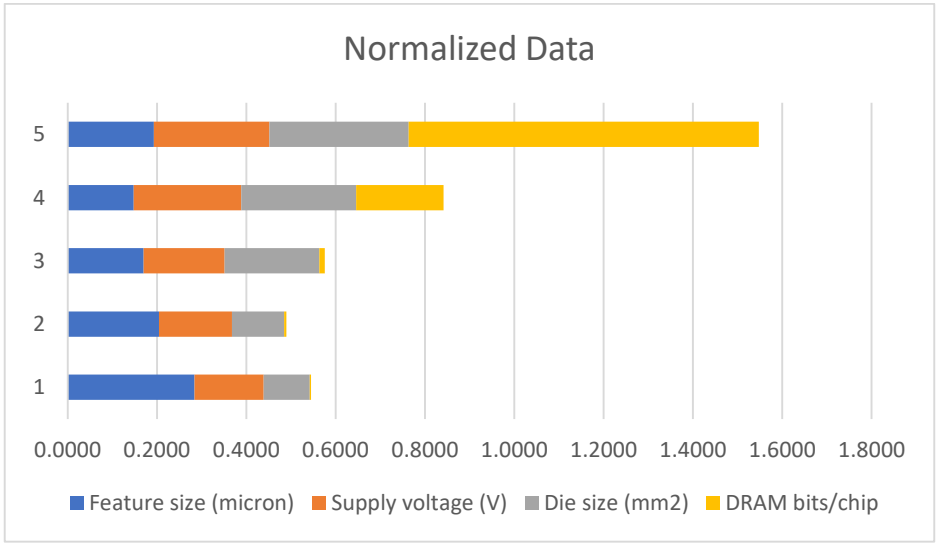

FIGURE 2. Normalized Data

Figure 2. shows the graphical representation Normalized Data Alternative: CISC are Intel 386, Intel 486, Pentium, EPIC is IA-64, DEC Alpha 21164. Evaluation preference: Feature size (micron), Supply voltage (V), Die size (mm2), DRAM bits/chip (m).

TABLE 3. Weight

Weight			
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25

Table 3 shows the weight of the weight is equal for all the value in the set of data in the table 1. The weight is multiplied with the previous table to get the next value.

TABLE 4. Weighted normalized decision matrix

Weighted normalized decision matrix			
0.071023	0.038793	0.025685	0.000763
0.051136	0.040948	0.02911	0.001212
0.042614	0.045259	0.053082	0.003058
0.036932	0.060345	0.064212	0.048965
0.048295	0.064655	0.077911	0.196003

Table 4 shows the weighted normalization decision matrix it is calculated by multiplying the weight and performance value in table 2 and table 3.

TABLE 5. Bi & Ci & Min(Ci)/Ci

Bi	**Ci**	**Min(Ci)/Ci**
0.109816	0.026448	1
0.092085	0.030321	0.872245
0.087872	0.05614	0.471101
0.097277	0.113177	0.233682
0.112951	0.273914	0.096554
min(Ci)*sum(Ci)	0.013224	2.673583

Table 5 shows the value of Bi, Ci, Min(Ci)/Ci The Bi is calculated from the sum of the CISC are Intel 386, Intel 486, Pentium, EPIC is IA-64, DEC Alpha 21164 The Ci is calculated from the sum formula used.

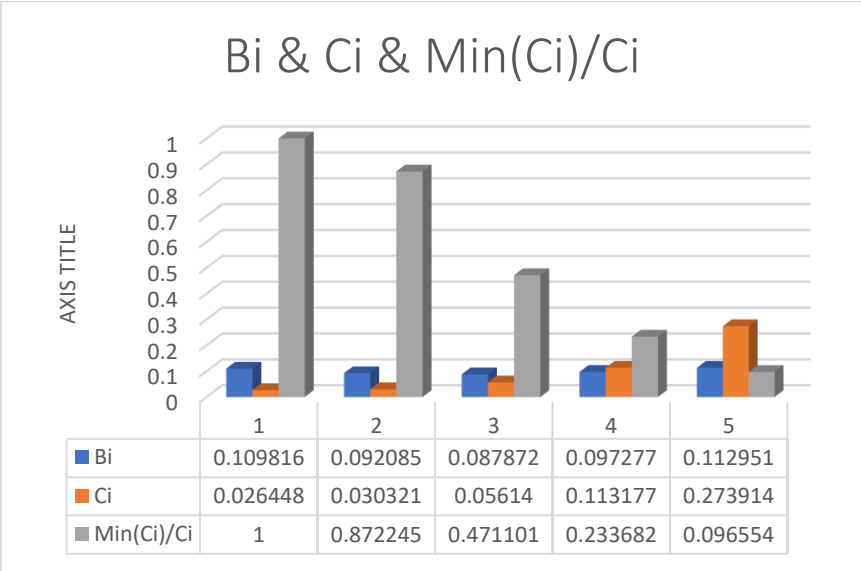

FIGURE 3. Bi & Ci & Min(Ci)/Ci

Figure 3 shows the the value of Bi, Ci, Min(Ci)/Ci The Bi is calculated from the sum of the CISC are Intel 386, Intel 486, Pentium, EPIC is IA-64, DEC Alpha 21164 The Ci is calculated from the sum formula used.

TABLE 6. Qi &Ui&Ui %

Qi	Ui	Ui %
0.296831	100	100%
0.255208	85.97745	86%
0.175975	59.28471	59%
0.140979	47.49465	47%
0.131008	44.13549	44%

Table 6 shows the Qi &Ui&Ui % value Qi sum, minimum formulas using this table.

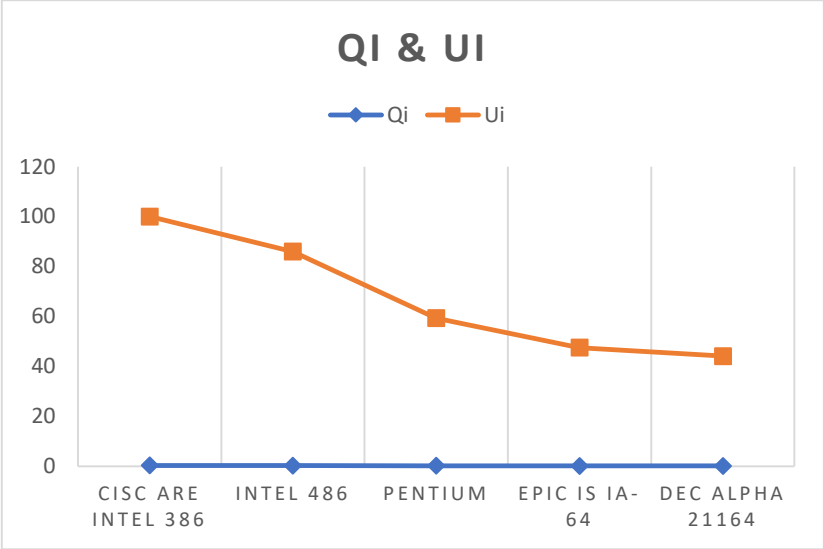

FIGURE 4. Qi &Ui

Figure 4 shows the Ui value of CISC are Intel 386 = 100, Intel 486 = 85.97745, Pentium = 59.28471, EPIC is IA-64 = 47.49465, DEC Alpha 21164 = 44.13549.

TABLE 7. Rank

	Rank
CISC are Intel 386	1
Intel 486	2
Pentium	3
EPIC is IA-64	4
DEC Alpha 21164	5

Table 7 shows the final result of this paper the CISC are Intel 386 is in 1st rank, the Intel 486 is in 2nd rank, the DEC, the Pentium is in 3rd rank, the EPIC is IA-64 is in 4th rank and Alpha 21164 is in 5th rank. The final result is done by using the COPRAS method.

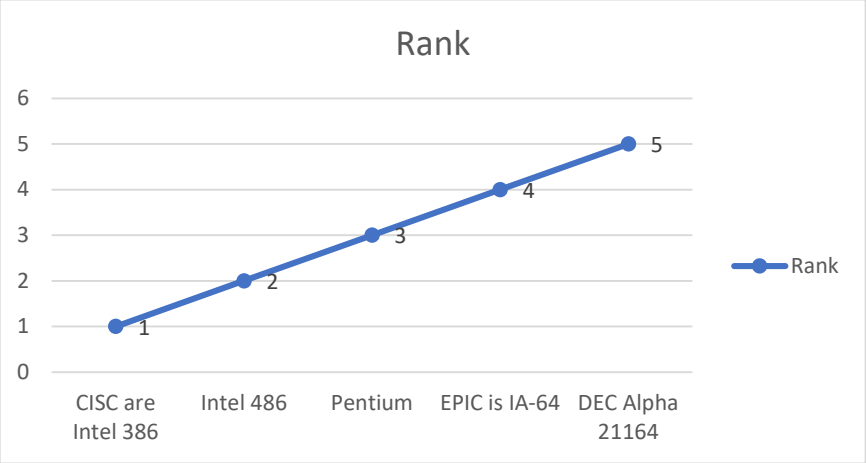

FIGURE 5. Rank

Table 5 shows the final result of this paper the DEC Alpha 21164 is in Fifth rank, the Intel 486 is in Second rank, the EPIC is IA-64 is in Fourth rank, the Pentium is in Third rank and the CISC are Intel 386 is in First rank. The final result is done by using the COPRAS method.

4. CONCLUSION

A microprocessor is a computer that is the central unit of the system, It is arithmetic and logic performs functions, Usually from a part of this Numbers for another area Addition, subtraction, and two Comparing numbers including is mostly Processor, central processing unit Or known as logic chip. In von Neumann's architecture, execute program instructions Microprocessor executes A circuit called to execute a program, the microprocessor First program instructions and them from memory Data required for operation receives Then, the microprocessor Decode and instructions Extract the data and run the program Required components and paths Enables. Finally, The microprocessor executes the program, operates through means, Manipulates data, and makes decisions and saves. The microprocessor is The core of a computer system is the unit, which is arithmetic and performs logical operations, usually from a part of this Numbers for another area Addition, subtraction, and two Comparing numbers including It is often the processor, Central processing unit or called a logic chip. of the computer while turning on the computer For machine or brain movement will go It is programmable, A multi-purpose device is a CPU Central processing unit functions An IC is included in the integrated circuit. A microprocessor binary data Accepts as input, Processing the data, then stored in memory Based on instructions Provides output. of the microprocessor ALU Arithmetic and Logical Unit, Control unit, and registered Data using an array are being processed. Record order, Temporary fast access memory Multiple registers that act as destinations Processes data via Instructions by computer and controls the flow of data Administered by the unit. CPUs were huge. Designers until the 1960s The microprocessor performs the functions of the CPU They tried to integrate it into units. The successful development of the microprocessor led to the home computer. General Microprocessors for purpose are our Computers for text editing, multimedia Visually, computationally and on the Internet For communication Allows use. They are How fast, how small and are energy efficient Because they are every day In the development of technology are integrated, This includes appliances, smartphones And so on. Microprocessor-based Because it changed the world, it is what it is, And how it works It is worth understanding that, A microprocessor is a computer An important part of the structure, Without it, on your computer, Nothing can be done. it is a programmable device The input contains some arithmetic and Performs logical operations to produce the desired output. The final result of this paper is DEC Alpha 21164 ranks fifth, Intel 486 ranked second There is, EPIC IA-64 fourth Ranked, Pentium has ranked third and CISC Intel 386 Top Rank There is The result is COPRAS is done using the method

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