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REAL-LIFE ANALOGIES USED TO EXPALIN THE CONTROL FLOW STATEMENT IN C PROGRAMMING LANGUAGE

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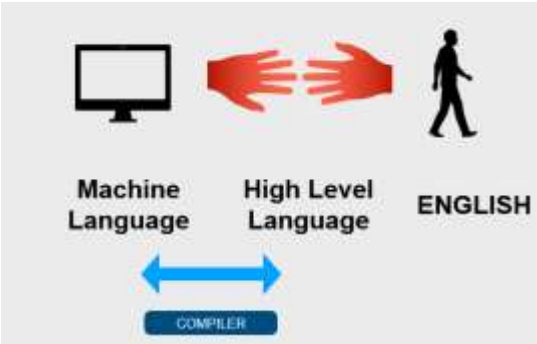
***Abstract*—** in human civilization, several of C programming application we used in day to day life. C programming is a basic alphabetic of computer background people. C is powerful programming language because it's easily communicate with both machine and human. To Human it will communicate with High level language of English. In machine, it will converted the high level code into machine understandable code like 0's and 1's. Many complicate real life problems easily solved by using C programming. In this paper we analysis real life analogies how applied and adapted in C Programming language and Concept oriented analysis will helpful to new bees who start their carrier in any programming.

I. Introduction

MIT economics professor Richard Bookstaber put it simply in his book "The End of Theory": "No man is better than a machine, and no machine is better than a man with a machine." The synthesis approach is based on the realization that both machines and humans have shortcomings. Machines have many different types of advantages as compared to humans. Firstly, machines do their work much faster and more efficient than human beings. Machines have a very high efficiency and they perform their duties at a faster rate than humans, without the need of rest like human beings. Computer still now they known only binaries [1]. Human staring in creative thinking, imagine, visually memorization better than machine. Human only High level languages only. Convert the high-level language to machine level code it's called as complier. Pic 1. Shown Complier main process.



Pic 1. Machine vs. English

C is a general-purpose computer programming language. It was created in the 1970s by Dennis Ritchie, and remains very widely used and influential. By design, C's features cleanly reflect the capabilities of the targeted CPUs. C programming language is a machine-independent programming language that is mainly used to create many types of applications and operating systems such as Windows, and other complicated programs such as the Oracle database, git- hub, Python interpreter, and games and is considered a programming foundation in the process of learning any other programming language. Operating systems and diverse application software for computer architectures ranging from supercomputers to PLCs and embedded systems are examples of such applications. In this paper we used some real-life analogies used to explain the Control flow statement in C Programming language. Rest of this paper organized as Section II. We detail explained the C programming syntax. Section III. Discus different Data Types with real life analogies. Section IV. We analysis control statements with real life analogies (RLA).

II. Syntax of C Programming

In C Programming language have a six main sections there are header, define, main variable declaration, body of main and finally return. In Header section we include standard libraries used access predefined C Programming codes. C have rich library files there are stdlib.h, math.h, time.h, assert.h, stdio.h,

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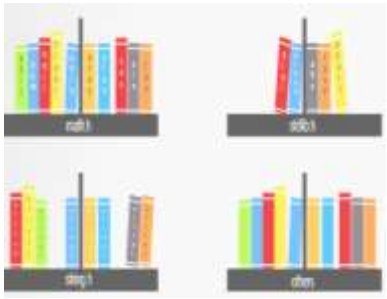
wchar.h, nl_types.h, ctype.h, wctype.h, locale.h, setjmp.h, string.h, langinfo.h, signal.h, regex.h, stdarg.h and error.h. Each header file have lot of sub division files [2].

header file	
define macro	
main	
main start	
variable declaration	
body	
return	
main close	

```c
#include <stdio.h>
#define NUM 10
int main()
{
   int sum, num2 = 20;
   sum = NUM + num2;
   printf("%d",sum);
   return 0;
}
```

Table 1. C Programming Structure with arithmetic expression

In define section, we using a macro is a piece of code in a program that is replaced by the value of the macro. Macro is defined by #define directive. Whenever a macro name is encountered by the compiler, it replaces the name with the definition of the macro. In Main section contains the main function of the code. The compiler starts execution from the main () function. In body section we can use static variables, inbuilt functions, and user-defined functions, control and loop statements. Inside body we use return statement. A return statement ends the execution of a function, and returns control to the calling function. Execution resumes in the calling function at the point immediately following the call [3].

stdlib.h, math.h, time.h, assert.h, stdio.h, wchar.h, nl_types.h, ctype.h, wctype.h, locale.h, setjmp.h, string.h, langinfo.h, signal.h, regex.h, stdarg.h error.h.	

Pic 2. C libraries

A return statement can return a value to the calling function. In table 1. Dispatched the C Programming Structure. In this program define the macro NUM as 10 and open the main, inside the main declare two variable sum and num2 as 20. Next line used arithmetic operator to add the different variables and stored in sum. After that using printf function displayed the sum variable [5].

III. Data types

In real life, we using different kind of container for stored different types of products. Same like in C program using different types of data type stored different type of machine data based on their nature. Pic 1. Shown real life analogy about data [7].

int , char,	

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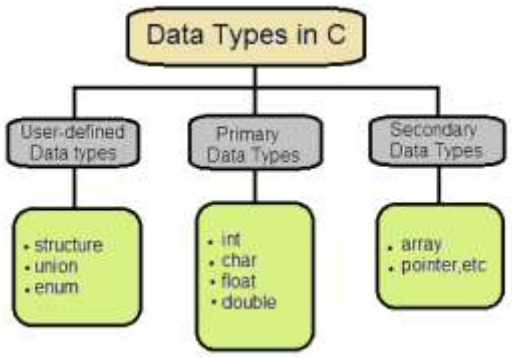
float, double, long int	
array, pointer	
structure, union, enum	
void	

Table 2. C Data Types

In C Programming language, data types classified into three categories. Primary, secondary and user defined. In primitive there are four basic data types namely char, int, float, and double. In secondary data types is array, pointer. And finally user defined data types are structure and union. Pic 1. Shown calcification of data types [3].



Pic. 3 Data types in C

III. Control flow Statements

In real life, day to day we apply many flows. When we get hungry we eat food, when we thirsty we drink water. Water dam is the best example for controlling the water flow based on some condition. The control statements used in the C language help a user to specify a program control's flow.In control statements help users specify the order of execution of the instructions present in a program. These make it possible for the program to make certain decisions, perform various tasks repeatedly, or even jump from any one section of the code to a different section. Control statement classified into three types. There are Decision, loop, and jumping statement [4].

Pic 4. Water dam (Control flow)

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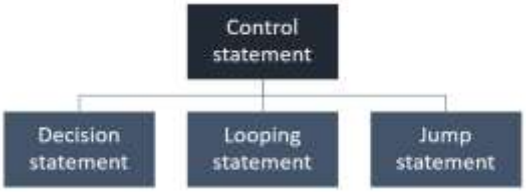


Pic 5. Classification of Control statement

A. Decision statement

- **if statement**

If statement consists of a Boolean expression followed by one or more statements. In real life, when we take decision, that is based some condition. Below analogy, in a circuit boards, we switch on LED light. Here we apply if condition, when the electricity pass to circuit after that the LED light will be ON and otherwise not on.

```
#include <stdio.h>
#include <stdlib.h>

int main()
{
    int supply_on=1;
    if(supply_on==1)
    {
        printf("LED-ON");
    }
    return 0;
}
```

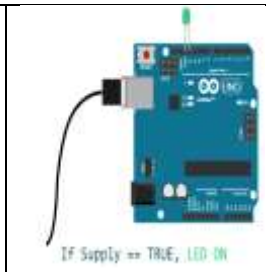
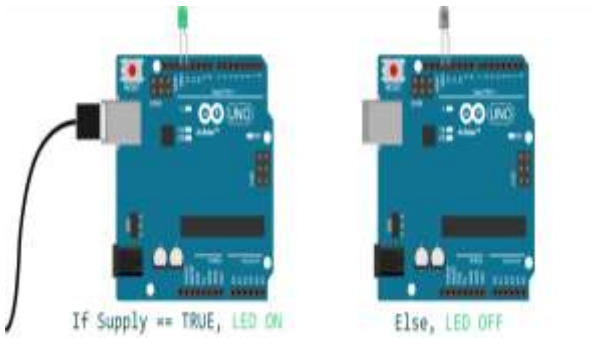


Table 3. If Statement

- **If else statement**

If statement can be followed by an optional else statement, which executes when the Boolean expression is false. In real life, when rain fall will happen we open umbrella otherwise we close umbrella. Below analogy, in a circuit boards, we switch off LED light. Here we apply if else condition, when we remove electricity to circuit LED light will be off and otherwise ON [6].

Pic 6. Analogy of If else statement



Pic 7. Analogy of If else statement

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- **Else if statement**

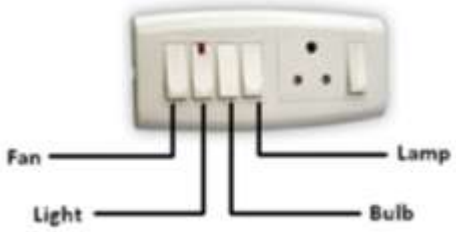
In real life, we arrive new station we all should face this issue. How to choice path from various ways. We decide path based some condition. Same like The else-if statement is an extension to the if-else statement. It is used in the scenario where there are multiple cases to be performed for different conditions [8]. In else-if ladder statement, if a condition is true then the statements defined in the if block will be executed, otherwise if some other condition is true then the statements defined in the else-if block will be executed, at the last if none of the condition is true then the statements defined in the else block will be executed. There are multiple else-if blocks possible. It is similar to the switch case statement where the default is executed instead of else block if none of the cases is matched [10].

Pic 8. Else if statement

iv. Switch statement

In real life, we entering new constructing house, that house has four different rooms. Our choice for select any room visit first. Same like switch statement. Switch case statement evaluates a given expression and based on the evaluated value (matching a certain condition), it executes the statements associated with it. Basically, it is used to perform different actions based on different conditions (cases).

Pic 9. Real life switch statement 1



Pic 10. Real life switch statement 2

In switch circuit that has four switches first one fan, next light, next Lamp, blub and three pin holder, and electricity on switch. This same like switch statement we chosen switch based on our choice.

B. Loop Statement

In real life, time clock is best example loop, because it running indefinitely. Same like loop statement. A program loop is a series of statements that executes for a specified number of repetitions or until specified conditions are met. Loop statement classified into three, there are for, while and do while [9].

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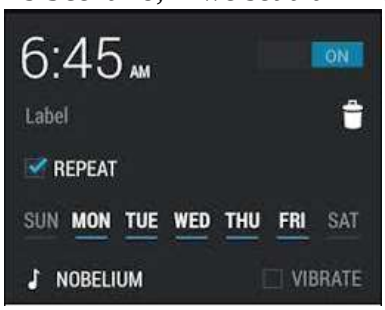
For	
While	
Do while	

Table 4. Real life loop statement

i. for

In real life, every day we set alarm for wakeup or some important work. For loop will very useful for this Scenario, if we set alarm for 6.45 AM, then repeat the alarm for Monday to Friday.



Pic 11. Alarm

Pic 12. For loop statement

Above pic. Display numbers 1 to 10 when we know definite condition we apply for. A "For" Loop is used to repeat a specific block of code a known number of times. For example, if we want to check the grade of every student in the class, we loop from 1 to that number.

ii. While

A while loop in C programming repeatedly executes a target statement as long as a given condition is true. When the number of times is not known before hand, we use a "While" loop. For example, if we want to ask a user for a number between 1 and 5, we don't know how many times the user may enter a larger number.

Pic 13. While loop statement

iii. do while

The do-while loop is a variant of the while loop. This loop will execute the code block once, before checking if the condition is true, and then it will repeat the loop as long as the condition is true. do part execute the body loop, while part check conditions.

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Pic 14. Do-while loop statement

C. Jump Statement

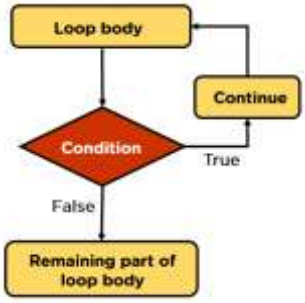
i. break

In real life, we all should cross speed breakers, it has reduce our vehicle speed. Break statement and same like in c programming it will break the flow of execution. The break command allows you to terminate and exit a loop (that is, do , for , and while) or switch command from any point other than the logical end.

Pic 15. Break statement

ii. Continue

The continue statement in C language is used to bring the program control to the beginning of the loop. The continue statement skips some lines of code inside the loop and continues with the next iteration.



Pic 16. Continue statement

IV. Conclusion

In this paper mainly focus on real-life analogies used to explain control flow statements of condition control, loop control and jump statement in programming language. In this paper we applied more real-life example to explain the concepts of programming structures, it will help for the beginners to solving problem and also how we thing the problems into programmatic style, how to frame problems, how to arrives the solution in this area. This analogies will really help for those who budding computer programmer at beginning level. Future we try to use all the concepts based on real-life analogies.

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