MINIPROJECT REPORT

# DIGIT DEGREE PROGRAM

1. **Problem statement**

* Define the “digit degree” of a non-negative integer as the number of times we need to replace this number with the sum of its digits until we get to a one-digit number

+ Input: a non-negative integer n

+ Output: digitDegree(n)

* Catch error if input is

+ a non-digit

+ negative number

+ null

1. **Used labels & registers in main**
   1. **Labels**

initial\_value: input values n

order: output digitDegree(n)

promptString: “Input a valid value:”

outputString: “digitDegree(n) = “

* 1. **Registers**

$v0: contains initial value

$t0: returns 1 if initital value >= 10

0 if initial value < 10

1. **Used labels & registers in subprogram “digit\_sum”**
   1. **Labels**

tempt: tempory value to print for each digit and sum of digits

* 1. **Registers**

$v0: contains sum of each digit of a number

$t0: contains value of %label

$t1: condition register (return 1 if true, 0 if false)

$t2: store value of each digit in %label

1. **Function’s Algorithm**
   1. **main**

* initialize digit degree = 0
* check input if valid or not
* while loop until sum of each element in the number (or the present number) less than 10, inside the loop:

+ call digit\_sum function for the present number to calculate sum of each digit of it

+ the next number = sum of each digit in the previous loop

+ increase digit degree by 1

* print the outputString and the digit degree of the input number as the result
  1. **digit\_sum(%label)**
* @parameter: $t0 = initial\_value
* @return: $v0 = sum of each digit in initial\_value number
* initialize sum = 0
* while loop until $t0 = 0, inside the loop:

+ print each digit of the input number with “ + “ sign

+ sum += each digit (use $t0 % 10 to get the most left element and $t0 / 10 to get the next right element)

* print “=” and print “🡪” for the next loop in main if exists

1. **Pseudocode**

void P21(int t){

sum = 0;

while(t > 0){

printf("%d", t%10);

sum += t%10;

t /= 10;

if (t > 0) printf(" + ");

}

printf(" = %d", sum);

if (sum < 10) return;

else {

printf(" -> ");

P21(sum);

}

}

printf(“digitDegree(n) = %d“, sum);