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PROBLEM #01:-

a) Age of Person (in Years):-

unsigned int because it cannot be negative and is usually two digits.

b) Speed of Light:- unsigned long int

~~long int~~ because it is constant positive value.

c) Gender:-

char because it has only two possible values (M & F).

d) Coordinates of a point:-

float because they can be anywhere on the Cartesian plane.

e) Factorial of a number:-

long long unsigned int because it can be a very large integer.

f) Number of plants in a region:-

unsigned int because it will always be a positive whole number value.

g) Mass of an electron:-

double because it is fractional value, usually written in scientific notation.

PROBLEM #02:-

a) 0.000000

b) -9 = -(7%2)-8 = -(+1)-8 [-9]

c) 1 = 5 & $c != 8$ is true and $!c$ is true

d) 7 7 7 (b is assigned to c, which is assigned

e) 6 6 6 to a)

$$z = -3 \% - 8 / 2 + 7$$

$$z = -3 / 2 + 7$$

$$z = -1 + 7 [= 6]$$

PROBLEM #05:-

a) w = 1, x = 0, y = 1, z = 1

Because x is the only conditional which requires all operands to be true.

b) 0 2 0.000000 2.000000

Since / takes precedence over * in C, division takes place first. When denominator is greater, it evaluates to

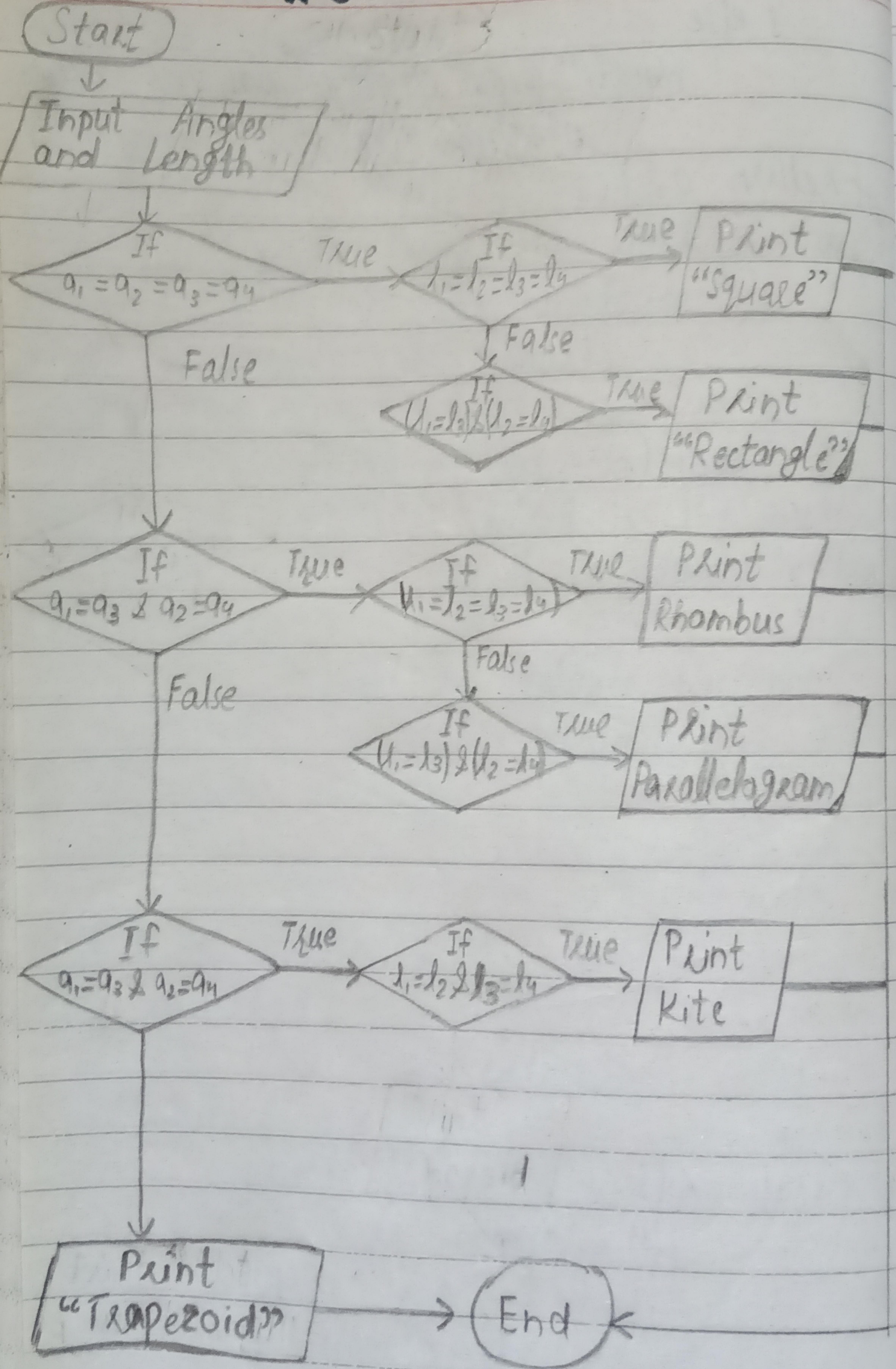
zero. Or when numerator is greater, it truncates to 1 which multiplies by 2 to give 2 (or 2.000000 in floating points).

c) $a = 1$
 $b = 0.000000$

$a = 1$ because $-3 \% 2 = -1$ and condition $-1 \mid = -3$ evaluates to true (which is 1).

$b = 0.000000$ because the format specifier used is $\%f$ whereas b is an int.

PROBLEM #03:-



PROBLEM #04:-

Start

Input num, counter = 0

if (num > 9999 || num < 0)
 END

else

 input roll

 a = num / 1000

 b = num / 100 % 10

 c = num / 10 % 10

 d = num / 1 % 10

 if (a == roll)

 counter += 1

 if (b == roll)

 counter += 1

 if (c == roll)

 counter += 1

 if (d == roll)

 counter += 1

 print "last digit occurred" + counter

END

PROBLEM #07:-

START

INPUT $x_1, x_2, x_3, x_4, y_1, y_2, y_3, y_4$

$$m_1 = (y_2 - y_1) / (x_2 - x_1)$$

$$m_2 = (y_3 - y_2) / (x_3 - x_2)$$

$$m_3 = (y_4 - y_3) / (x_4 - x_3)$$

if ($m_1 == m_2 \text{ and } m_2 == m_3$)

print "The points fall on a straight line."

else

print "The points do not fall on a straight line"

END

PROBLEM #09:-

START

decimal = 0, binary = 0, n = 1, m = 0

input num

if (num < 10 || num > 99)

print "Invalid input"

END

else

while (num > 0)

$$i = num \% 2$$

$$num = num / 2$$

$$binary = binary + (i * n)$$

$$n = n * 10$$

repeat
print "Binary equivalent is" binary

while (binary > 0)

a = binary % 10

binary = binary / 10

decimal = decimal + (a * pow(2, m))

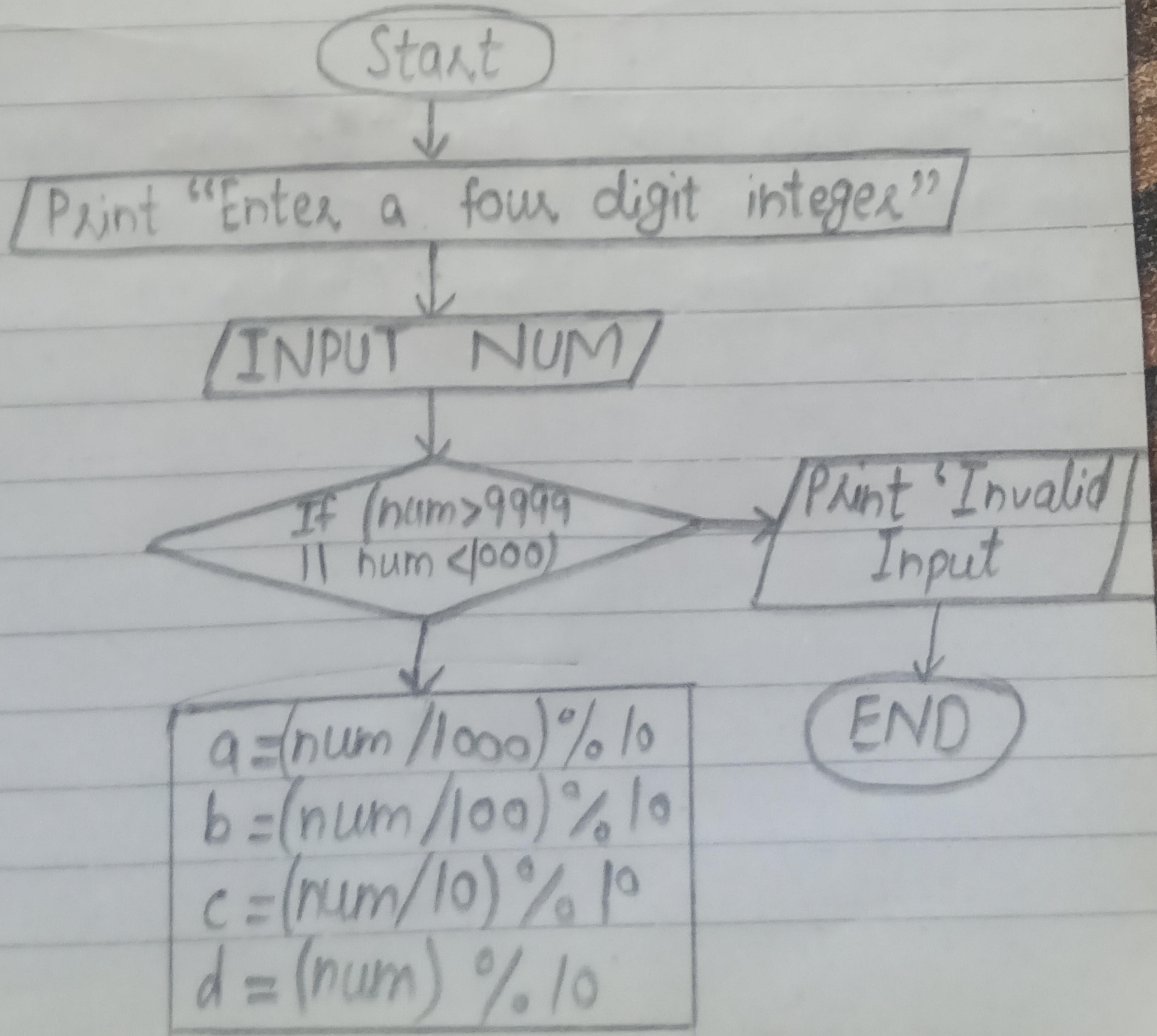
m = m + 1

repeat

print "Decimal equivalent is" decimal

END

PROBLEM #10:-



$$\begin{array}{|c|c|} \hline a_2 = (a + 5) \% 8 & \\ \hline b_2 = (b + 5) \% 8 & \\ \hline c_2 = (c + 5) \% 8 & \\ \hline d_2 = (d + 5) \% 8 & \\ \hline \end{array}$$

Print "The encrypted number is" a, b, c, d

$$\begin{array}{|c|c|} \hline a_3 = a_2 + 3 & \\ \hline b_3 = b_2 + 3 & \\ \hline c_3 = c_2 + 3 & \\ \hline d_3 = d_2 + 3 & \\ \hline \end{array}$$

False

If

True

$$a = a_3 \text{ and } b = b_3 \text{ and } c = c_3 \text{ and } d = d_3$$

Print "The data before and after encryption is not the same."

Print "The data before and after encryption is same. Congrats!"