1. A)

convert\_base\_ten\_to\_binary(123)

function binary\_number = convert\_base\_ten\_to\_binary(base\_ten\_number)

counter = 1;

binary\_number = 0;

while base\_ten\_number > 0 && counter < 100000000

temp = base\_ten\_number;

base\_ten\_number = bitshift(base\_ten\_number, -1);

if temp ~= bitshift(base\_ten\_number, 1)

binary\_number = binary\_number + counter;

end

counter = counter \* 10;

end

end

ans =

1111011

b)

convert\_base\_ten\_to\_ternary(123)

function ternary\_number = convert\_base\_ten\_to\_ternary(base\_ten\_number)

ternary\_number = 0;

counter1 = 1;

counter2 = 2;

base = 3;

while base\_ten\_number > 0 && counter1 < 100000000

if mod(base\_ten\_number, base) == 1

ternary\_number = ternary\_number + counter1;

end

if mod(base\_ten\_number, base) == 2

ternary\_number = ternary\_number + counter2;

end

base\_ten\_number = base\_ten\_number / base; %/ adds the remainder yuck

base\_ten\_number = floor(base\_ten\_number);

counter1 = counter1 \* 10;

counter2 = counter2 \* 10;

end

end

ans =

11120

1. a)

7 = 111

17 = 1 0001

Example to find bin(7 🡪 bin is 7/2 = 3 remainder 1, 3/2 = 1 remainder 1, 1/3 = 0 remainder 1)

b)

+ 0 0111

1 0001

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1 1000

c)2^3+2^4 = 24

7+17 = 24 so yes both answers agree as there was no carry bit

1. converging\_series()

function x = converging\_series()

i = 0;

result = 0.0;

result = 1/(4 + result);

while i < 8

i = i + 1;

result = 1/(4 + result);

end

result = result \*10; %/ forced to do this due to rounding

x = result + "e -1"; %/ error on display

end

1. MATLAB uses scientific notation after 10^8

This means MATLAB uses floats after 8 digits (yuck)

MATLAB registers numbers bigger than 10^308 as Inf

This means that MATLAB wraps into negative numbers after 1E309

1. Sign | Exponent | Mantissa

0 | 1001 1101 | 1000 1111 0010 1110 0001 010

+ | 157 - 127 | 1000 1111 0010 1110 0001 01

1.1000 1111 0010 1110 0001 01 \* 2 ^ 30

0110 0011 1100 1011 1000 0101 0000 0000

2^8 + 2^10 + 2^15 + 2^16 + 2^17 + 2^19 + 2^22+ 2^23 + 2^24+ 2^25 + 2^29 + 2^30

1,674,282,240

1.67428224E9