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CSS EXPERIMENT 2

**Program:**

%% Chinese Remainder Theorem

% Asks for 'k' no of equations in form of remainders, divisors

% Displays the solution if all divisors coprime

clc;clear variables;close all;

%% Get remainders and divisors

k = input('Enter number of equations -> ');

M = 1;

for i = 1:k

[rem(i),div(i)] = deal(input('Enter remainder -> '),input('Enter divisor -> '));

M = M\*div(i);

end

%% Checking if all divisors are coprime

for i = 1:k

for j = i+1:k

[mi,gcd] = mulinv(div(i),div(j));

if(gcd ~= 1)

fprintf('The calculation of answer not possible since the divisors are not coprime');

return

end

end

end

%% Calculate answer if all the divisors are coprime

fprintf('The divisors are coprime\n');

for i = 1:k

m(i) = M/div(i);

minv(i) = mulinv(m(i),div(i));

end

x = mod(sum(rem .\* m .\* minv),M);

fprintf('Answer: %d\n',x);

**Function to calculate GCD, Multiplicative Inverse**

function [mi,gcd] = mulinv(r1,r2)

[a,b,s1,s2,t1,t2] = deal(r1,r2,1,0,0,1);

while(r2 ~= 0)

q = floor(r1/r2);

r = r1-(r2\*q);

s = s1-(s2\*q);

t = t1-(t2\*q);

[r1,r2,s1,s2,t1,t2] = deal(r2,r,s2,s,t2,t);

end

gcd = r1;

mi = mod(s1,b);

end

**Output (1):**

Enter number of equations -> 3

Enter remainder -> 1

Enter divisor -> 5

Enter remainder -> 2

Enter divisor -> 6

Enter remainder -> 3

Enter divisor -> 7

The divisors are coprime

Answer: 206

**Output (2):**

Enter number of equations -> 4

Enter remainder -> 1

Enter divisor -> 5

Enter remainder -> 2

Enter divisor -> 7

Enter remainder -> 3

Enter divisor -> 9

Enter remainder -> 4

Enter divisor -> 11

The divisors are coprime

Answer: 1731

**Output (Not coprime case):**

Enter number of equations -> 3

Enter remainder -> 1

Enter divisor -> 5

Enter remainder -> 2

Enter divisor -> 7

Enter remainder -> 3

Enter divisor -> 10

The calculation of answer not possible since the divisors are not coprime