6 → months 7 → days 4 → days in a week

$x < y$

Day x of month y

Day y of month x

02/01

	1	2	3	4	
Week 1	1	2	3	4	1
Week 2	5	6	7	1	2
Week 3	2	3	4	5	
Week 4	6	7	1	2	3
Week 5	3	4	5	6	
Week 6	7	1	2	3	4
Week 7	4	5	6	7	
Week 8	1	2	3	4	5
Week 9	5	6	7	1	6
Week 10	2	3	4	5	
Week 11	6	7	1	2	
Week 12	3	4	5	6	
Week 13	7				

$$\frac{13}{4} \quad 2$$

$\{4$

$$[(y-1)d + x] \equiv [(x-1)d + y] \pmod w$$

$\boxed{m}$ .pb

2 – 1 $(yd + x) \equiv (xd + y) \pmod w$

3 – 1

4 – 1

5 – 1

6 – 1

7 – 1

[m] [d] . pb(vals)

set<int>

[m] [day]

$$\boxed{a \equiv b \pmod w} \; 1$$

x^{th} day of y^{th} month ⇒ $d_1 = (y-1)d + x$

y^{th} day of x^{th} month ⇒ $d_2 = (x-1)d + y$

$a \equiv b \pmod{w}$.

$\boxed{a = kw + b}$

$[(y-1)d + x] \equiv [(x-1)d + y] \pmod{w}$

$[(y-1)d + x] = kw + [(x-1)d + y]$

$yd + x = kw + xd + y$

$yd - xd + x - y = kw$

$d(y-x) + (x-y) = kw$

$-d(x-y) + (x-y) = kw = (1-d)(x-y)$

$(d-1)\underbrace{(x-y)}_{\substack{x \,\&\, y \\ \text{are variables}}} = \underbrace{k}_{\text{adjusted}}w$

$(d-1)(x-y) = 0 \pmod{w}$.

$\dfrac{(d-1)}{\gcd(d-1,w)}(x-y) = k\dfrac{w}{\gcd(d-1,w)}$

constantly we divide by their gcd.

$\dfrac{w}{\gcd(d-1,w)} \to w'$

$\gamma(x-y) = kw'$

$\boxed{\gamma(x-y) \equiv 0 \pmod{w'}}$

This equation we see that w' must divide $\gamma(x-y)$ but we know that there is no common factor in them (i.e, γ & w'). The only way we can divide $\gamma(x-y)$ is by tweaking $(x-y)$.

day month

$\boxed{(x-y) \equiv 0 \pmod{w'}}$

$$\boxed{1 \le x, y \le \underbrace{\min(d, w)}_{z}}$$

$[1, z]$

$q = z \,\%\, w'$

$r \in \{0 \ldots r-1\}$

$$\boxed{{}^{q}C_{2}\, w' + {}^{q}C_{1}\, r}$$