Recitation 3: Extended Euclid, Project 1 check

Instructions: Submit to gradescope by the deadline.

Problem 1 : Extended Euclid, Power inverse Given pair a, b, find $\gcd(a, b)$ and coefficients x, y such that $ax + by = gcd(x, y)$.
If gcd=1, separately calculate the power set $\mathbb{P}(a) \mod b$ to find $order(a)$ and $a^{-1} \mod b$, and the power set $\mathbb{P}(b) \mod a$ to find $order(b)$ and $b^{-1} \mod a$.

i. $a = 25, b = 7$

a	b	q	r	x	y	verify
25	7					

ii. $a = 46, b = 18$

a	b	q	r	x	y	verify
46	18					

iii. $a = 104, b = 9$

a	b	q	r	x	y	verify
104	9					

Problem 2 Proj 1 2SAT check : concepts Write in bullet points your plan for Proj 1: how to store data, how to use the implication graph, how to control assignments, how to traverse "Truth" through the graph etc. You can use as an example this 2CNF formula + its graph below, but the plan has to be general not specific to it: $(x_1 \vee \neg x_2) \wedge (\neg x_1 \vee \neg x_3) \wedge (x_3 \vee x_4) \wedge (\neg x_2 \vee \neg x_4) \wedge (x_2 \vee \neg x_4)$

Problem 3 Proj 1 2SAT check : code

Show to a TA the code setup you have for Proj 1. You should have a good sense of :
- how to load data
- how basic arrays/matrices work
- how to run a basic loops
- how to represent a graph of implications as adj matrix or list

Please submit the code you have as pdf - part of this recitation paper. It wont count for the final project grade.

Problem 4(optional, no credit) ★★★ Prove that prime number $p > 2$ is the sum of two squares ($p = a^2 + b^2$) if and only if $p = 1 \mod 4$.