Directions:

- Do only the Checkpoint problems that you need to take and feel ready to take. If you have already earned Mastery on a Learning Target, do not attempt a problem for that Target! You can skip a Target if you need more time to practice with it, and take it on the next round.
- Do not put any work on this form; do all your work on separate pages. You may either handwrite or type up your work.
- Clearly indicate which Learning Target you are attempting at the beginning of its solution; please also turn in solutions for learning targets in order (for example, do not turn in work for A.2 after work for SF.1). The easiest way to do this is to put each Learning Target on its own solution page and do not put more than one Learning Target on a single page.
- If you are handwriting, submit your work by **scanning your work** using a scanning app or scanning device; **do not just take a picture** but scan your work to a clear, legible, black and white PDF file of size less than 100 MB. Work submitted as an image file (JPG, PNG, etc.) will not be graded.
- Unless explicitly stated otherwise, you must show your work or explain your reasoning clearly on each item of each problem you do. Responses that consist of only answers with no work shown, or where the work is insufficient or difficult to read, or which have significant gaps or omissions (including parts left blank) will be given a grade of "x".
- Submit your work by uploading it as a PDF or Word file to the appropriate assignment area on Blackboard.

Learning Target A.1: *I can represent an integer in base 2, 8, 10, and 16.*

Perform all of the following conversions. Show all work and explain all reasoning.

1. 883 in decimal; convert to binary and hexadecimal.
2. 11010010 01010110 in binary; convert to decimal and octal.
3. 113 in octal; convert to decimal.

Learning Target A.2 (Core): *I can add, subtract, multiply, and divide two integers written in binary.*

Perform all of the following computations in binary, without changing to base 10. Show all work and explain all reasoning.

1. `00101010 + 11010101`
2. `11010101 - 00011011`
3. `1100111 × 111`
4. `1100111 ÷ 111`

Learning Target A.3: *I can compute $a\%b$ given integers a and b and perform arithmetic mod n.*

Perform all of the following computations and either show your work or explain what you did in words.

1. $555\%19$
2. $(-652)\%20$
3. $7491117143048354781 7\%2$

4. $(684 + 368)\%11$
5. $(571 \times 296)\%8$
6. $(8^{50})\%9$ using repeated squaring

Learning Target L.1: *I can use propositional variables and logical connectives to represent statements; and interpret symbolic logical statements in plain language.*

Consider the following statements:

- A = "The temperature outside is less than 60 degrees"
- B = "It's raining"
- C = "I will wear a jacket"

1. Translate the following English sentences into symbolic logic expressions:
   (a) If the temperature outside is less than 60 degrees, then I'll wear a jacket.
   (b) Either it's not raining, or I am wearing a jacket and it's less than 60 degrees outside.
2. Translate the following symbolic logic expressions into clear English sentences:
   (a) $C \leftrightarrow (B \wedge A)$
   (b) $(\neg B) \vee (C \wedge A)$