NAME:

Closed book. No calculators, no computer.
Write all answers on these sheets. Do not ask questions!

<table>
<thead>
<tr>
<th>question</th>
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<td>20</td>
<td>15</td>
<td>10</td>
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1. What is a compiler?

2. View C2 as a number in the hexadecimal system. What is C2 in the decimal system?
3. Consider the circuit drawn below:

(a) For $x = 0$ and $y = 1$, what is the outcome of this circuit?
    *Mark the results on the circuit drawing above.*

(b) What is the logical expression that represents this circuit?

4. Given a natural number $t$ representing time in minutes.
   Write Python code to print the value of $t$ in days, hours, and minutes.
   The number representing the days, hours, and minutes is followed respectively by the
   characters d, h, and m.
   For example: $123 = 2h 3m$, $23 = 23m$, $1442 = 1d 2m$. 
5. Consider the flowchart:

(a) What *expression* does the algorithm in the flowchart compute?  
(Do NOT evaluate the expression into one number.)

(b) Write Python code to implement the algorithm.
6. Given a vector with coordinates \((v_1, v_2, v_3)\), its product is \(v_1 \times v_2 \times v_3\).

Write a Python function (call it \texttt{product}) which takes on input the coordinates of a vector and returns the product of the coordinates. Make sure the function also works for planar vectors, so the user can enter only two coordinates.

7. Give the Python commands to generate a random 10-letter word.
   Use \texttt{random.randint()} to uniformly generate letters.
   The final result is a string of 10 characters.