1. What is a register?

2. View A4 as a number in the hexadecimal system. What is A4 in the decimal system?
3. Consider the circuit drawn below:

\[ x \rightarrow \downarrow \rightarrow \uparrow \rightarrow \downarrow \rightarrow y \]

(a) For \( x = 1 \) and \( y = 0 \), 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 \( n \) is a natural number which represents time in a 24 hour format.
Write Python code to print the corresponding time in AM/PM format.
Some examples: \( 845 = 845 \text{ AM} \), \( 2045 = 845 \text{ PM} \), and \( 1221 = 1221 \text{ PM} \).
5. Consider the flowchart:

```
\( s = 1; \ p = 2; \ k = 0 \)

\( k < 9 \) ?
\quad False \ \text{print} \ s
\quad True
\quad \quad s = s + p
\quad \quad p = p \times 2
\quad \quad k = k + 1
```

(a) What \textit{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. The length of a vector with coordinates \((v_1, v_2, v_3)\) is \(\sqrt{v_1^2 + v_2^2 + v_3^2}\).

Write a Python function (call it \texttt{length}) which takes on input the coordinates of a vector and returns the length of the vector. Make sure the function works also 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.