COMP108 Algorithmic Foundations — Background Survey

Name: _____

1. Are you interested in solving puzzles like the one given at the beginning of the lecture?
   Very interested / A little bit interested / Not interested

2. Do you remember what the function $\sqrt{n}$ means? **YES / NO**

   Do you remember what the function $\log_2 n$ means? **YES / NO**

   $\sqrt{n}$ is the inverse of square: if $y = x^2$, then $x = \sqrt{y}$; e.g., $5 = \sqrt{25}$ because $25 = 5^2$.
   $\log_2 n$ is the inverse of power of 2: if $a = 2^b$, then $b = \log_2 a$; e.g., $5 = \log_2 32$ because $32 = 2^5$.

3. What is the value of $\sqrt{64}$? _____ $\log_2 64$? _____

4. Do you remember how to **expand** a polynomial, e.g., $(x+1)(x+2)$? **YES / NO**

   Do you know how to **factorize** a polynomial, e.g., $x^2 + 3x + 2$? **YES / NO**

   Expanding a polynomial in x, say $(ax+b)(cx+d)$, is to express it in an expanded form without brackets, $(ax + b)(cx + d) = acx^2 + adx + bcx + bd = acx + (ad + bc)x + bd$. For example, expanding $(x + 1)(x + 2)$ gives $x^2 + 2x + x + 2 = x^2 + 3x + 2$.

   Factorizing is the reverse process of expansion, factorizing $acx^2 + (ad + bc)x + bd$ gives $(ax + b)(cx + d)$. For example, factorizing $x^2 + 3x + 2$ gives $(x + 1)(x + 2)$.

5. Try to expand the expression $(x + 2)(x + 3)$: _____

   _____

   Try to factorize the polynomial $x^2 + 5x + 6$: _____

   _____

6. Have you learned Mathematical Induction (or Induction simply) before? **YES / NO**

7. Have you heard of the term **pseudo code** before this lecture? **YES / NO**

8. Try to complete the following **while-loop** to print the value of $2 * i$ in each iteration up to 20. In other words, your code should output 2, 4, 6, 8, 10, 12, 14, 16, 18, 20.

   $i =$ _____

   while (_____) do

   begin

   print _____

   $i =$ _____

   end