- Int
Output
  - Sum of the first n prime numbers (int)

7. An algorithm which calculates the sum of the first 107 prime numbers
Inputs
  - nothing
Output
  - Sum

Example precondition: array input is not null
Binary Search
Pre: array is sorted. (& not null)
Post: output is true if and only if integer is in array

2. Cleaning your teeth
Precondition
  - Teeth exist
Post-condition
  - Teeth are clean

3. Precondition
  - Array is not null and array is sortable
Post-condition
  - The array is sorted

4. Precondition
  - They exist and are available
Post-condition
  - Meal is edible

5. Precondition
  - Board is in legal configuration
  - There is possible move to make
Post-condition
  - The move is legal

6. Precondition
  - N is an integer greater than 1
Post-condition
  - The output is actually the output

21/02/17
Wake up at 10:00 am
Run washing machine at 10:10 am
Stack dishwasher at 10:15 am
Run dishwasher at 10:20 am
Watch Maths lecture and do tutorial questions sheet at 10:25 am
Hang out clothes at 10:50 am
Unstack dishwasher at 11:00 am
Wash wooden spoons and cutting boards at 11:05 am

SUMOFSQUARES=0
Problem: Given an array of Strings (of length 'n'), find out if there are two strings which are the same.
check = false
loop i from 0 to n-2 <- worse case n-1 times
   loop j from i+1 to n-1 <- worst case n-1 times
      if NAMES[i] = NAMES[j] <- this gets done <=(n-1)^2 times (n^2-2n+1)
         check = true;
      end if
   end loop
end loop
output check

Given a sorted array S of integers, find whether a value v, in S
i = 0
loop while i < S.length < s.length
   if v = S[i] <- happens s.length times in the worst case
      return true
   i = i + 1
end loop
return false
let n be S.length
running tie: 3n
running time is proportional to n

Binary search halves search space every step
Binary search. in k steps you could search a 2^{k-1} size array
steps -> size of array
1 - 1
2 - 2
3 - 4
4 - 8
5 - 16
n=2^{k-1}
log n = k

Problem: Write a pseudocode algorithm which takes a sorted array of integers S, and a value v as input and returns true if there are two elements of S which add to v and returns false otherwise.

input v
result = false
loop j from 0 to s.length-1 <- n times
   loop i from j to s.length-1 <- n times
      if s[j] + s[i] = v <- 4

Algorithm C:
SUM = 0
input N = 5
SUM = N * (N+1)/2
output "The Sum is:" +SUM

Flag
FOUND = False
FOUND = True
FOUND = False

4/08/17
A = 10
B = 4
Runs infinite times

A = 4
B = 10
Runs 0 times

A = 10
B = 9
"com" "sci" "ftw"

A = 10
B = 0
Com, ftw

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

8/08/17
4.3.6 -> 4.3.8
Learning Intention: The basic terms of programming including variable, constant, operator and objects and when to use variables vs constants in algorithms
Variable
- An identifier of a memory location to store data in a program.
- The value can be changed during normal execution of the program
- the value is variable.
- Has a name and data type determined at its creation and cannot be changed.

NUM = 5
if NUM < 3
    then output "under 3"
else if NUM == 3
    then output "Equals 3"
else
    then output "Over 3"
end if
4.3 Introduction to programming

4.3 introduction to programming (13 hours)
   Nature of programming languages
   Use of programming languages