COMP 250 Assignment #2 – Winter 2017

Alex Hale

ID: 260672475

1. 1. An array sorted in descending order will be the worst case because the swap code (i.e. inside the if condition) must run every loop.
   2. Line 1: Tassign + Tcomp (repeated n times) + (Tarith +Tassign) (repeated n-1 times)

Line 2: Tassign + Tcomp (repeated n-i+1 times) + (Tarith + Tassign) (repeated n-i times)

Line 3: Tindex + Tcomp + Tarith + Tindex + Tcond = 5

Line 4: Tindex + Tassign = 2

Line 5: Tarith + Tindex + Tassign + Tindex = 4

Line 6: Tassign + Tarith + Tindex = 3

Line 3 to 6: 14 (repeated n-i times)

* **is**

1. a) given

b) is

c) is

d) is

e) is

8) Announcement = “Some people have a blue face” ⬄ *At least* one person has a blue face

* if there had only been one person on the island with a blue face:
  + day 1: Person A doesn’t see anybody on the island with a blue face. There must be one person with a blue face, so they must be the one and only person with a blue face.
  + night 1: person A dies
* if there had been two people on the island with a blue face:
  + Day 1: Person A sees that Person B has a blue face, and nobody else. Since there is *at least* one person with a blue face, Person A knows that there are two cases: a) B is the one person with a blue face, or b) both A and B have blue faces. B undergoes the same logical process in reverse
  + Night 1: A and B do not know if they have a blue face. Nobody dies
  + Day 2: A sees that B is still alive. If B had not seen anybody else with a blue face on Day 1, then they would have died on Night 1. Therefore, A knows that case b) is true, and they have a blue face. B undergoes the same logical process
  + Night 2: Person A and Person B die
* if there had been k people on the island with a blue face:
  + by inductive reasoning:
    - one person with blue face => they would have died first night
    - two people with blue faces => they both would have died 2nd night
    - …
    - k people with blue faces => they will all die the kth night
* There are 10 people on the island with a blue face. They will each become certain of whether they have a blue face on the 10th day, because the 9 people they can see with blue faces will all be alive or all be dead. They all realize that they have blue faces on the 10th day, so they all die on the 10th night.