CS 110 Lab Sheet 4

Lab cycle starting 23rd October 2019, NAH: Normal Deadline, two weeks after your usual lab in that cycle.

Stage 1: Morning, Afternoon or Night

Write a program to read in an integer - using a Scanner - in the range 1 to 24 representing an hour of the day (24hr clock time), and prints out if that hour is morning, afternoon or night - you are free to decide when 'night' starts and ends. HINT: Start off just writing the if statement you will need for this using fixed values (without the Scanner) first, and then extend it with the Scanner.

Stage 2: Richter Earthquake Scale

Write a program that reads in a floating point number (instead of in.nextInt() use in.nextDouble()) in the range of 0 upwards and, using if statements, prints out the *first sentence* of the *Richter Scale* definition/description of earthquake intensity for that number - for example, if the number entered is 3.5, the program should print:
Often felt by people, but very rarely causes damage.
You can find a table of Richter Scale values and descriptions here (scroll down):
https://en.wikipedia.org/wiki/Richter_magnitude_scale
HINT: *Don't* type the descriptions in, and *don't do the whole scale (just, say, the first or last four)* - cut and paste the descriptions (you might need to tidy the strings up - split them over multiple lines, and fix the double-quote characters etc. - but you won't need to type them all).

Alternatively do the same thing but with the Beaufort wind scale - print out the sea conditions description - which you can find here:
https://en.wikipedia.org/wiki/Beaufort_scale
(Once again, use cut and paste to avoid typing, and don't do all of them - just four.)
HINT: your program should mainly be a sequence of if else, if else, ending in a final else without an if.

Stage 3: European County Capitals and Populations

Using the table on this page:
https://en.wikipedia.org/wiki/Demographics_of_Europe
write a program that reads in the name of a country and prints out the capital and population - as above, just pick any *four* countries to do this for (it's a long table - maybe go for some unusual ones). This is similar to Stage 2 but you are comparing strings not doubles. REMEMBER that comparing strings is *not* the same as comparing numbers - use `.equals()` (or `.equalsIgnoreCase()` which is case independent).

Stage 4: Use a Switch Statement

Modify your program from Stage 3 to use a *switch* statement instead of an *if* statement.

Stage 5: Legal Day and Month

Write a program to read in two integers representing a day (between 1 and 31) and a month (between 1 and 12). Then check out if that is a legal date. for example, 30 and 2 (30th February) is not, but 12 5 (12th May) is. If you can't remember:-) February has 28 days (ignore leap years); April, June, September and November have 30 days; and all the

others have 31. REMEMBER that days and months cannot be negative - this is obvious but many people forget it. HINT: There are lots of ways to do this, so you might want to think about a few alternatives - the ideal solutions are not too long but also have clear and simple logic. It's perfectly possible to do this with switch statements, if-else statements, nested if-else statements, or with logical (and, or) operators - or a combination of both.

Assessed Stage 6: Legal Day, Month and Year

Extend your program from Stage 5 so it does take account of leap years - which means in *some* years 29th February is a legal date.
HINT 1: a year is a leap year if it's exactly divisible by 4, but NOT if it's also divisible by 100, UNLESS it's ALSO divisible by 400. So 2016 was a leap year (divisible by 4 but not 100: 1900 was not a leap year and neither will 2100 - divisible by 4 but also by 100; however, 2000 was a leap year, divisible by 100, but also by 400).
HINT 2: the logical way to do this is to work out if a year is a leap year first, and use that information to determine if 29th February is a legal date or not.

Challenge Task

Write a program that not only completes the assessed task in Stage 6 above, but also prints out the date in the following format "X th Y ZZZZ" where X is the number of the day; Y is the month NAME (not the number); and ZZZZ is the year. REMEMBER that you must print one of "nd", "st", "rd", or "th" after the number of the day X, depending on the value of X.

Serious Challenge Task!

As for the challenge task but also add the day of the week - this is non-trivial but a fairly clear description is here:

https://cs.uwaterloo.ca/~alopez-o/math-faq/node73.html