**Name:**

**Advanced Programming in Java**

**Lab Exercise 12/19/2024**

1. Write a program that allows the user to enter a distilled water temperature value and a letter C for Celsius or F for Fahrenheit. The user should also enter the altitude above sea level. The program should print whether it is solid, liquid, or gas. Note that the boiling point of water drops 1 degree C for every 1000 feet of altitude.
2. Write a program that computes your income tax for single taxpayers using the following schedule:

|  |  |  |  |
| --- | --- | --- | --- |
| If your status is single and if your taxable income is over | but not over | the tax is | of the amount over |
| $0 | $9,525 | 10% | $0 |
| $9,525 | $38,700 | $953 + 12% | $9,525 |
| $38,700 | $82,500 | $4,454 + 22% | $38,700 |
| $82,500 | $157,500 | $14,090 + 24% | $82,500 |
| $157,500 | $200,000 | $32,090 + 32% | $157,500 |
| $200,000 | $500, 000 | $45,690 + 35% | $200,000 |
| $500, 000 | ---- | $150,690 + 37% | $500,000 |

The program should ask the user to enter their adjusted gross income (AGI) and it will print their income tax.

1. Write a program that prompts the user for the frequency of an electromagnetic wave. The program should print it’s wavelength and the type of electromagnetic wave it is. The relationship between wavelength (λ) and frequency (f) is:

λ = C/f where C is the speed of light (3 x 108 meters/second)

Use the following table to determine the type of waveform.

|  |  |
| --- | --- |
| Type | Wavelength (meters) |
| Radio Wave | > 10-1 |
| Microwave | 10-3 to 10-1 |
| Infrared | 7 x 10-7 to 10-3 |
| Visible Light | 4 x 10-7 to 7 x 10-7 |
| Ultraviolet | 10-8 to 4 x 10-7 |
| X-Ray | 10-11 to 10-8 |
| Gamma Ray | < 10-11 |

Note: Frequencies that comprise the electromagnetic spectrum 3 Hz (ELF) to 7 x 1019 Hz (Gamma rays)

1. First N Vowels

Write a function that returns the first n vowels of a string.

Examples

firstNVowels("sharpening skills", 3) ➞ "aei"

firstNVowels("major league", 5) ➞ "aoeau"

firstNVowels("hostess", 5) ➞ "invalid"

Notes

Return "invalid" if the n exceeds the number of vowels in a string.

Vowels are: *a, e, i, o, u*