

Write a program to implement the following:

- Calculate the minimum length of an antenna based on the frequency.**

By using Python Programming Language:

CODE:

```
c = 299792458 # Speed of light in m/s

# Map the frequency units to their corresponding multipliers to allow the user to enter any unit
frequency_units = {
    "Hz": 1,
    "kHz": 1000,
    "MHz": 1000000,
    "GHz": 1000000000
}

# Get the frequency from the user and split the input into a numerical value and a unit of frequency
frequency_str = input("Enter the frequency with its unit separated by space (e.g., 2.5 GHz): ")
frequency_parts = frequency_str.split()
frequency = float(frequency_parts[0]) # save the numerical part inside "frequency"
frequency_unit = frequency_parts[1] # save the unit part inside "frequency_unit"

# Check for the frequency unit and convert the frequency to Hz
if frequency_unit in frequency_units:
    frequency_multiplier = frequency_units[frequency_unit]
    frequency_hz = frequency * frequency_multiplier
    # if the entered unit is invalid
else:
    print("Invalid frequency unit.")
    exit()

# Calculate the minimum length of the antenna
wavelength = c / frequency_hz # Step 1
antenna_length = round((wavelength / 4), 3) # Step 2 calculate the antenna length and round the result to 3 decimal places

# Print the result
print("\nThe minimum length of the antenna for a frequency of", frequency_str, "is", antenna_length, "meters.")
```

CODE Snapshots:

```
Antenna Calculator Code.py X
C: > Users > alhar > Desktop > CSE453 Project > Antenna Calculator > Antenna Calculator Code.py > ...

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18 # Check for the frequency unit and convert the frequency to Hz
19 if frequency_unit in frequency_units:
20     frequency_multiplier = frequency_units[frequency_unit]
21     frequency_hz = frequency * frequency_multiplier
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23 else:
24     print("Invalid frequency unit.")
25     exit()
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27 # Calculate the minimum length of the antenna
28 wavelength = c / frequency_hz # Step 1
29 antenna_length = round((wavelength / 4), 3) # Step 2 calculate the antenna length and round the result to 3 decimal places
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31 # Print the result
32 print("\nThe minimum length of the antenna for a frequency of", frequency_str, "is", antenna_length, "meters.")
```

CODE TEST:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

Enter the frequency with its unit separated by space (e.g., 2.5 GHz): 3 kHz

The minimum length of the antenna for a frequency of 3 kHz is 24982.705 meters.

C:\Users\alhar>
```