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REGISTRATION NUMBER-21BCE2942

ACXC163N - Recent Trends in Refrigeration and Air Conditioning

Event Task 1: Cooling Load Calculator of a Building

SCOPE Student

Objective: Create a Python program that calculates the cooling load for a building based on user input.

CODE:-

```python
#S.SAI YASWANTH REDDY,21BCE2942
def calculate_cooling_load(area, num_occupants, building_type, outdoor_temp, indoor_temp):
    if building_type.lower() == "residential":
        cooling_load = 100 * num_occupants
    elif building_type.lower() == "commercial":
        cooling_load = 150 * num_occupants
    else:
        raise ValueError("Invalid building type. Supported types: residential, commercial")

    u_coefficient = 30  # W/m²°C
    q_conduction = u_coefficient * area * (outdoor_temp - indoor_temp)
    sensible_cooling_load = q_conduction + cooling_load

    return sensible_cooling_load

# Taking user inputs
try:
    area = float(input("Enter the area of the building (in square meters): "))
    num_occupants = int(input("Enter the number of occupants in the building: "))
    building_type = input("Enter the type of building (residential/commercial): ")
    outdoor_temp = float(input("Enter the outdoor temperature (in Celsius): "))
    indoor_temp = float(input("Enter the indoor desired temperature (in Celsius): "))

    cooling_load = calculate_cooling_load(area, num_occupants, building_type, outdoor_temp, indoor_temp)
    print(f"The sensible cooling load is: {cooling_load} W")
except ValueError as e:
    print(f"Error: {e}")
```

OUTPUT:-

```
Enter the area of the building (in square meters): 500
Enter the number of occupants in the building: 10
Enter the type of building (residential/commercial): residential
Enter the outdoor temperature (in Celsius): 45
Enter the indoor desired temperature (in Celsius): 17
The sensible cooling load is: 421000.0 W


...Program finished with exit code 0
Press ENTER to exit console.
```

WEBPAGE:-

2942.html:-

```
C: > Users > yaswa > Desktop > <> 2942.html > ...
  1   <!DOCTYPE html>
  2   <html>
  3   <head>
  4       <title>Cooling Load Calculator</title>
  5       <style>
  6           body {
  7               font-family: Arial, sans-serif;
  8           }
  9
 10           .container {
 11               max-width: 400px;
 12               margin: 0 auto;
 13               padding: 20px;
 14               border: 1px solid #ccc;
 15               border-radius: 5px;
 16           }
 17
 18           label {
 19               display: block;
 20               margin-bottom: 5px;
 21           }
 22
 23           input {
 24               width: 100%;
 25               margin-bottom: 10px;
```

```
 26               padding: 5px;
 27           }
 28
 29           button {
 30               padding: 8px 20px;
 31               background-color: #4CAF50;
 32               color: white;
 33               border: none;
 34               border-radius: 5px;
 35               cursor: pointer;
 36           }
 37
 38           button:hover {
 39               background-color: #45a049;
 40           }
 41
 42           #result {
 43               margin-top: 15px;
 44               font-weight: bold;
 45           }
 46       </style>
 47   </head>
 48   <body>
 49       <div class="container">
 50           <h2>Cooling Load Calculator</h2>
```

```html
        <label for="area">Area of the building (in square meters):</label>
        <input type="number" id="area" required>

        <label for="num_occupants">Number of occupants in the building:</label>
        <input type="number" id="num_occupants" required>

        <label for="building_type">Type of building:</label>
        <select id="building_type" required>
            <option value="residential">Residential</option>
            <option value="commercial">Commercial</option>
        </select>

        <label for="outdoor_temp">Outdoor temperature (in Celsius):</label>
        <input type="number" id="outdoor_temp" required>

        <label for="indoor_temp">Indoor desired temperature (in Celsius):</label>
        <input type="number" id="indoor_temp" required>

        <button onclick="calculateCoolingLoad()">Calculate</button>

        <div id="result"></div>
    </div>

    <script>
        function calculateCoolingLoad() {
            const area = parseFloat(document.getElementById("area").value);
            const num_occupants = parseInt(document.getElementById("num_occupants").value);
            const building_type = document.getElementById("building_type").value;
            const outdoor_temp = parseFloat(document.getElementById("outdoor_temp").value);
            const indoor_temp = parseFloat(document.getElementById("indoor_temp").value);

            const coolingLoad = building_type === "residential" ? 100 * num_occupants : 150 * num_occupant
            const uCoefficient = 30;
            const qConduction = uCoefficient * area * (outdoor_temp - indoor_temp);
            const sensibleCoolingLoad = qConduction + coolingLoad;

            document.getElementById("result").innerText = `The sensible cooling load is: ${sensibleCooling
        }
    </script>
</body>
</html>
```
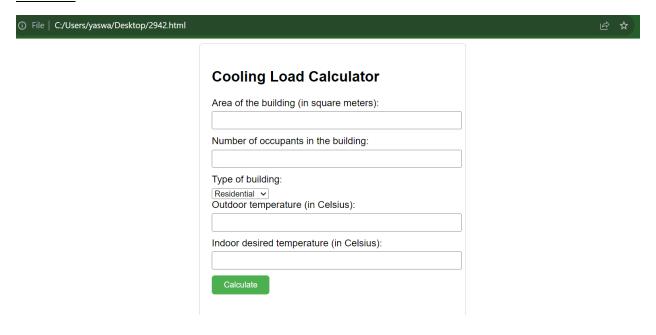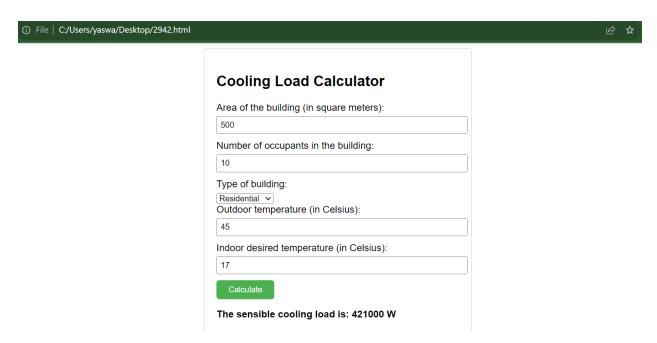
OUTPUT:-

Cooling Load Calculator

Area of the building (in square meters):

Number of occupants in the building:

Type of building:
Residential ⌄
Outdoor temperature (in Celsius):

Indoor desired temperature (in Celsius):

[Calculate]

Cooling Load Calculator

Area of the building (in square meters):
500

Number of occupants in the building:
10

Type of building:
Residential ⌄
Outdoor temperature (in Celsius):
45

Indoor desired temperature (in Celsius):
17

[Calculate]

The sensible cooling load is: 421000 W

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