# **C++ project Description**

**Problem**:

A party planning agency is developing an application to manage room reservations for a given year.

**Room characteristics**:

* Code: integer
* Price: float
* Number of seats: integer
* Number of events: integer
* Event history: to record event details for room reservations (assume a maximum of 300 events).

**Event characteristics**:

* ID: integer
* Responsable :String
* Budget: float
* Number of guests: integer
* Date: comprising day, month, and year.

Example:  
Code: 1234  
Price: 1425.36  
Seats: 120  
Events: 3  
Event history:

| **Event ID** | **Budget** | **Guests** | **Date** |
| --- | --- | --- | --- |
| 12 | 1526.45 | 100 | 30/06/2022 |
| 14 | 1639.70 | 90 | 03/07/2022 |
| 15 | 2500.00 | 110 | 14/07/2022 |

**Tasks**:

1. Discuss and propose appropriate data structures for this application.
2. Think and Explain how we can use tree data structure in this problem. You are not asked for implementation
3. Write a procedure to enter room information, initializing the number of events to 0 and all event IDs to 0.

**Procedure**: Enter\_Room\_Info(…)

1. Write a procedure to dynamically allocate and fill a collection of n rooms, and return it.

**Procedure**: Fill\_Room\_collection(…)

1. Write a function to check if a room exists in the dynamic room data strucure TS by its code.
   * Return the room's position if it exists.
   * Return 0 if it does not exist.

**Function**: Search\_Room(…): integer

1. Write a procedure to display all rooms.

**Procedure**: List\_Rooms(….)

1. Write a function to enter event details.

**Function**: Enter\_Event(…): Event

1. Write a procedure to reserve a room based on the following steps:
   * Find the first room where:
     + Price ≤ event budget.
     + Number of seats ≥ guests.
     + Room is available on the event date.
   * If a room is found, add the event to its history. Otherwise, display an error message.

**Procedure**: Reserve\_Room(….)

1. Write a function to return the number of reservations for a room in a given month.

**Function**: Count\_Room\_Reservations(….): integer

1. Write a function to find and return the most reserved room in a given month.
2. Write a procedure to replace a room R1 by an other R2 based on the following steps:
   * If a room is found, add the events of R1 to all events of R2 to its history and then delete R1. Otherwise, display an error message.

**Function**: Most\_Reserved\_Room(…): Room

1. Write the main program to perform, through a menu, the following:
   * Fill the room table.
   * Reserve a room for a given event.
   * Display the rooms.
   * Determine the most reserved room for a given month.