A1 – Topic Selection and Description

UCL Facilities Management

University Facilities Management Limited (UFML) is newly contracted to manage the University College London's real estate and all the assets contained within the estate. They have identified the need for a new database management system to help them achieve this complex task, and have decided to focus on a subset of the assets and estate management tasks to enable a quick deployment of a system that will meet the most urgent requirements on their list of facilities management tasks. As a whole, UFML is responsible for three major tasks on campus:

1. Cleaning - including vacuuming, emptying rubbish bins, vacuuming, washing floors and dusting, as well as wiping all kitchen surfaces, but does not include washing mugs or dishes.
1. Maintenance – ranging from replacing carpets and light bulbs, to replacing windows and doors.
2. Monitoring human comfort and safety – making sure that UCL staff and students are neither too hot nor too cold, and that the air quality in each room on campus is within standard limits and that systems are in place to handle any safety issue that breaks out across campus.

They have identified the following high priority information that they will need for the immediate implementation of some elements of these tasks:

1. Determine a safety perimeter of 200m from each building in case of fire.
2. Find out which buildings and rooms have temperature sensors
3. Count the number of sensors in each building.
4. Track which cleaners clean each room.
5. Make sure that no cleaners are cleaning more than three rooms
6. Key Performance Indicator 1 – determine the average temperature in each building during working hours (9am – 5pm)
7. Determine which windows need to be replaced and which building they are in.
8. Determine which rooms need to be repainted in the next 3 months and calculate the total surface area for repainting
9. Key Performance Indicator 2 - which building consumes more energy per year?
10. Calculate the maximum occupancy of each building based on the room size and type. Ignore any corridor space
11. Identify the rooms where the 10GB Ethernet backbone cable is available in each building.

Two buildings will be used for the purposes of this first database – the Chadwick Building, which is fully modernized and has double glazing throughout, and the Pearson Building, which is un-modernized. Energy consumption figures are available at £3000 per m3 per annum for modernized buildings, and £3500 per m3 per annum for un-modernized buildings. Designated room types on campus include: classrooms (1 person per m2), computer labs (1 person per m2), kitchens (0.5 persons per m2) and engineering labs (0.1 persons per m2). All other space comes under a category of 'other' (1 person per m2). Each room is 6m in height. Windows are replaced every 20 years, with double glazing units being installed as each window is replaced. Each classroom room should be repainted every three years, with all other rooms being repainted every 6 years. Cleaners are assigned to specific rooms, one cleaner per room. A cleaner can clean up to three rooms a day. Some of the source geometry data for this database will be extracted from an existing Building Information Model, which has been created in Revit.

Entity #	Entity Name	Spatial	3D
1	Building	Yes	Yes
2	Room	Yes	No
3	Temperature Sensor	Yes	Yes
4	Ethernet Cable Network	Yes	No
5	Windows	Yes	No
6	University	Yes	No
7	Cleaner	No	No
Totals		**6**	**2**

#	***Requirement***	***Entity or Entities Required***	***Spatial Query***	***Join[1]***
1	Determine a safety perimeter of 200m from each building in case of fire.	*Buildings*	*Yes*	*No*
2	Find out which buildings and rooms have temperature sensors	*Buildings* *Rooms* *Temperature_Sensor*	*Yes*	*Yes*
3	Count the number of sensors in each building.	*Buildings* *Temperature_Sensor*	*Yes*	*Yes*
4	Track which cleaners clean each room.	*Rooms* *Cleaner*	*No*	*Yes*
5	Make sure that no cleaners are cleaning more than three rooms	*Rooms* *Cleaner*	*No*	*Yes*
6	Determine the average temperature in each building during working hours (9am – 5pm)	*Buildings* *Temperature_Sensor*	*Yes*	*Yes*
7	Determine which windows need to be replaced and which building they are in.	*Windows* *Buildings*	*Yes*	*Yes*
8	Determine which rooms need to be repainted in the next 3 months and calculate the total surface area for repainting	*Rooms*	*Yes*	*No*
9	Which building consumes more energy per year?	*Buildings*	*Yes*	*No*
10	Calculate the maximum occupancy of each building based on the room size and type. Ignore any corridor space	*Buildings* *Rooms*	*Yes*	*Yes*
11	Identify the rooms where the 10GB Ethernet backbone cable is available in each building.	*Ethernet_Cable* *Rooms*	*Yes*	*Yes*
TOTALS	***11***	***N/A***	***9***	***8***

[1] NB: A join is defined here as ANY function that uses more than one entity

Sketch Map