Are you ready for G20?

The **Group of Twenty** (also known as the **G-20** or **G20**) is an international forum for the governments and central bank governors from 20 major economies. The 11th G20 meeting will be held in China two years later. We assume that the final conference center locates in the Yangpu District of Shanghai. The host city need invest plenty of manpower the stability of the order of the city. As the development of unmanned aerial vehicle (UAV), it has been used in the field of the security. Now the government hires you to design a surveillance plan for the entire borough of Yangpu by the UAVs.

The current UAVs are relatively robust to complicated external environment, can fly up to 4 hours without need to refuel, and require no human being to monitor each of them – instead, a sophisticated computerized controller can be programmed to follow any patrol strategy of your choice. The government requires your team to accomplish the following different plans:

Requirement 1: All geographic point of Yangpu District should remain observed from the air for at least 15 minutes in a row. How many UAVs will you need to achieve this goal?

Requirement 2: Some parts of the district are more important, e.g. the neighborhood of Fudan University and the Wanda Plaza. Such areas should be observed at least once in each 5 minutes interval. On the other hand, some roads has lower density of people, and there is no need to observe it more than once in 20 minutes. How many UAVs will you need to provide the requested variable level of coverage?

Requirement 3: Assuming that all areas are equal important and should remain regularly observed, but some UAVs are not reliable and 30% of them become unusable. What kind of surveillance coverage will your plan provide?