Review for Quiz 2 (2017) continued

11. Let F_n be the closed interval

$$\left[\frac{1}{2^{n+1}} , \frac{1}{2^n} \right]$$

(where n runs through the nonnegative integers) so that $\cup_n F_n = (0, 1]$, a subset of the real line which is not open.

12. We can take A to be $[0, 1]$ and B to be $(0, +\infty)$ as a specific pair of examples. More generally, if X is a metric space, and we take $U \subset X$ to be an open set which is not closed and A to be a closed set which contains the limit points of U, then $U \cup A$ will be closed.