Exercises:

1. We have obtained S^2 by attaching E^2 to a singleton with the attaching map as the constant map on the boundary of E^2. Discuss how would you obtain S^n analogously as an adjunction space.

2. Show that if X and B are connected/path-connected then $X \sqcup_f B$ is connected/path-connected.

3. Describe the push out resulting from the diagram

$$\begin{array}{ccc} S^{n-1} & \xrightarrow{i_1} & E^n \\ {\scriptstyle i_2}\big\downarrow & & \\ E^n & & \end{array}$$

4. Show that $S^m \times S^n$ results from attaching an $n+m$ cell to $S^n \vee S^m$. Hint: Let denote $[0,1]$ and define a map $f : \partial(I^n \times I^m) \longrightarrow S^n \vee S^m$ as follows

$$f(z) = \begin{cases} (\eta_1(x), y_0) & \text{if } x \in \partial I^n \\ (x_0, \eta_2(y)) & \text{if } y \in \partial I^m \end{cases}$$ and $\eta_1 : I^n \longrightarrow S^n$ and $\eta_2 : I^m \longrightarrow S^m$ are the quotient maps of exercise 1.

5. Prove theorem (25.3).

6. Fill in the details in examples (25.4) and (25.5).