# ****Word Pair: Sunday → Saturday****

## ****1. Minimum Edit Distance****

### ****Model A (Sub = 1, Ins = 1, Del = 1)****

Sunday → Saturday

Operations:

Substitute **n → t** (cost = 1).

Insert **r** before d (cost = 1).

✅ **Minimum distance = 2**

### ****Model B (Sub = 2, Ins = 1, Del = 1)****

Substitution is expensive, so insertions/deletions are preferred.

Operations:

Delete **n** (cost = 1).

Insert **t** (cost = 1).

Insert **r** before d (cost = 1).

**Minimum distance = 3**

## ****2. Valid Edit Sequences****

**Model A sequence (distance 2):**

Step 1: Sunday → Sutday (substitute n → t)

Step 2: Sutday → Saturday (insert r)

**Model B sequence (distance 3):**

Step 1: Sunday → Suday (delete n)

Step 2: Suday → Sutday (insert t)

Step 3: Sutday → Saturday (insert r)

## ****3. Reflection****

Both models did **not** give the same distance:

Model A = 2 edits, Model B = 3 edits.

In **Model A**, substitution was cheap and very useful (n → t).

In **Model B**, substitution was costly, so a combination of insertions and deletions was preferred instead.

This shows that the **choice of cost model directly affects which edit path is chosen**.

For **spell check**, substitutions are very common (e.g., typing teh instead of the), so substitution should remain cheap.

For **DNA alignment**, substitutions may be biologically less likely than insertions/deletions, so Model B is more appropriate.