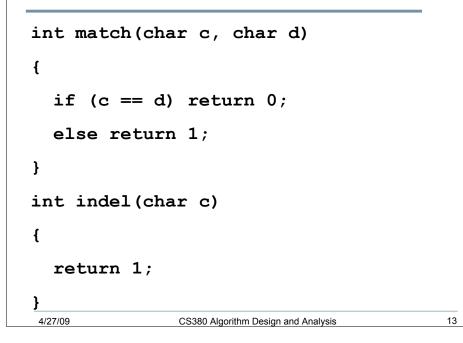
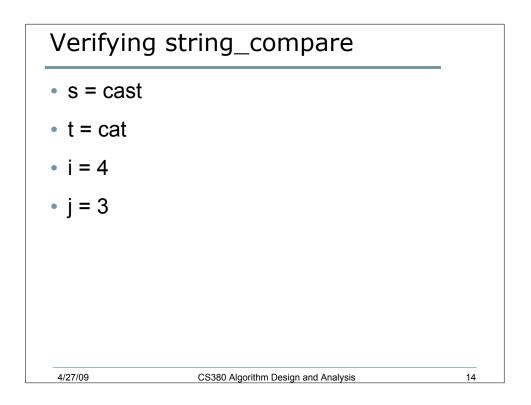
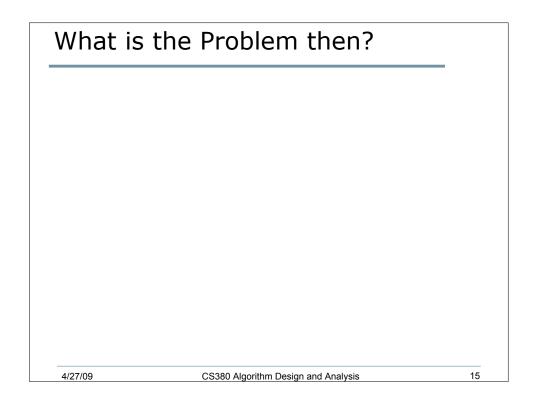
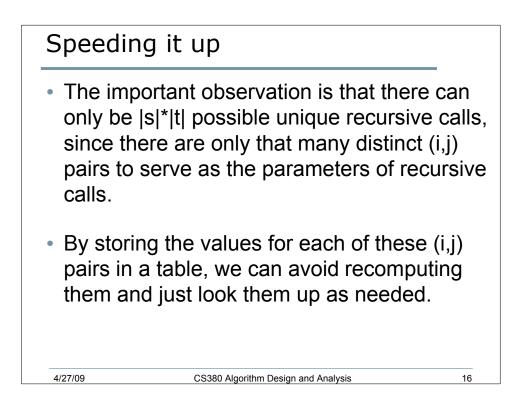


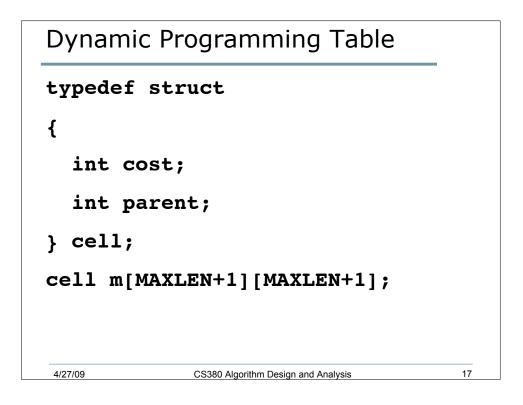
## Helper Functions











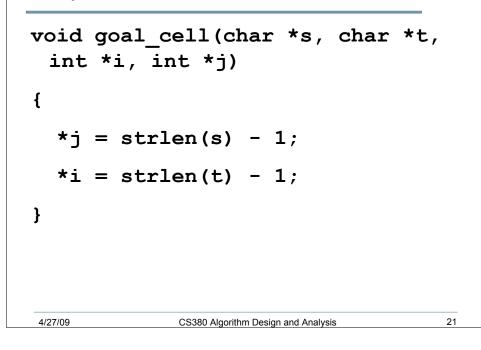
|   | DP E    | dit Distance  |    |
|---|---------|---|----|
| - | i<br>{  | <pre>nt string_compare(char *s, char *t) int i,j,k; (* counters *) int opt[3]; (* cost of the three options *) for (i=0; i <maxlen; (i="1;" (j="1;" (k="INSERT;" +="" <="" column_init(i);="" for="" i="" i++)="" indel(s[i]);="" indel(t[j]);="" j="" j++)="" k++)<="" k<="DELETE;" m[i][j].cost="opt[MATCH;" match(s[i],t[j]);="" opt[delete]="m[i-1][j].cost" opt[insert]="m[i][j-1].cost" opt[match]="m[i-1][j-1].cost" row_init(i);="" strlen(s);="" strlen(t);="" th="" {="" }=""><th></th></maxlen;></pre> |    |
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```
Helper Function
```

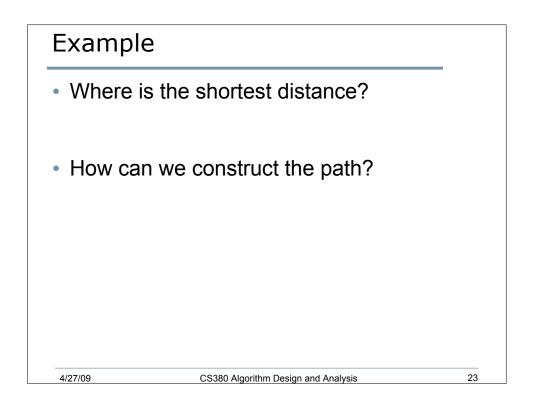
```
void row_init(int i)
{
    m[0][i].cost = i;
    if(i > 0)
    m[0][i].parent = INSERT;
    else
    m[0][i].parent = -1;
}
```

```
Helper Function
void column_init (int i)
{
    m[i][0].cost = i;
    if(i > 0)
    m[i][0].parent = DELETE;
    else
    m[0][i].parent = -1;
}
```

## Helper Function



| _ | Example  |   |   |   |   |  |  |  |
|---|--|---|---|---|---|--|--|--|
|   |  | - | С | А | Т |  |  |  |
|   | -  |   |   |   |   |  |  |  |
|   | С  |   |   |   |   |  |  |  |
|   | А  |   |   |   |   |  |  |  |
|   | S  |   |   |   |   |  |  |  |
|   | Т  |   |   |   |   |  |  |  |
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| Reconstruc | ting the Path   |    |
|------------|---|----|
| {          | uct_path(char *s, char *t, int i, int j)  |    |
|            | <pre>(m[i][j].parent == -1) return;<br/>(m[i][j].parent == MATCH) {<br/>reconstruct_path(s,t,i-1,j-1);<br/>match_out(s, t, i, j);</pre> |    |
| }<br>if (  | return;<br>(m[i][j].parent == INSERT) {<br>reconstruct_path(s,t,i,j-1);<br>insert_out(t,j);   |    |
| }<br>if (  | return;<br>(m[i][j].parent == DELETE) {<br>reconstruct_path(s,t,i-1,j);<br>delete_out(s,i);   |    |
| }          | CS380 Algorithm Design and Analysis   | 24 |

## Your Turn

- What is the edit distance between the following two DNA sequences:
  - CTACCG
  - TACATG
- How can one be converted to the other?

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