PREDICTION-BASED CODING

```
clear all;
close all;
clc;

input_string = 'BANANA$';
input_integers = [10, 5, 7, 9, 6, 9, 40];

[encoded_string, encoded_integers] = prediction_encode(input_string, input_integers);

[decoded_string, decoded_integers] = prediction_decode(encoded_string, encoded_integers);


original_string_bytes = numel(input_string) * 2;
original_integer_bytes = numel(input_integers) * 8;

encoded_string_bytes = numel(encoded_string) * 8;
encoded_integer_bytes = numel(encoded_integers) * 8;

compression_ratio_string = original_string_bytes / encoded_string_bytes;
compression_ratio_integers = original_integer_bytes / encoded_integer_bytes;

disp('Original String:');
```

```
Original String:
```

```
disp(input_string);
```

```
BANANA$
```

```
disp('Encoded String (ASCII Differences):');
```

```
Encoded String (ASCII Differences):
```

```
disp(encoded_string);
```

```
    66    -1    13   -13    13   -13   -29
```

```
disp('Decoded String:');
```

```
Decoded String:
```

```
disp(decoded_string);
```

```
BANANA$
```

```
disp('Original Integers:');
```

```
Original Integers:
```

```
disp(input_integers);
```

```
    10     5     7     9     6     9    40
```

```
disp('Encoded Integers (Differences):');
```

```
Encoded Integers (Differences):
```

```
disp(encoded_integers);
```

```
    10    -5     2     2    -3     3    31
```

```
disp('Decoded Integers:');
```

```
Decoded Integers:
```

```
disp(decoded_integers);
```

```
    10     5     7     9     6     9    40
```

```
disp('Compression Ratios:');
```

```
Compression Ratios:
```

```
disp(['  String: ', num2str(compression_ratio_string), ...
     ' (Original: ', num2str(original_string_bytes), ' bytes → Encoded: ', num2str(encoded_stri
```

```
  String: 0.25 (Original: 14 bytes → Encoded: 56 bytes)
```

```
disp(['  Integers: ', num2str(compression_ratio_integers), ...
     ' (Original: ', num2str(original_integer_bytes), ' bytes → Encoded: ', num2str(encoded_int
```

```
  Integers: 1 (Original: 56 bytes → Encoded: 56 bytes)
```