

# AI Assisted Coding

Lab Assignment – 3.1

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## Question 1: Zero-Shot Prompting – Palindrome Number Program

**Prompt Used:** Write a Python function to check whether a given number is a palindrome.

**AI-Generated Code:**

```
def is_palindrome(num):
    temp = num
    rev = 0
    while num > 0:
        digit = num % 10
        rev = rev * 10 + digit
        num //= 10
    return temp == rev
```

**Testing (Input / Output):**

Input	Output
121	True
123	False
0	True
-121	False

**Observations:** Works for positive integers. No validation for non-integers or negatives.

**Conclusion:** Zero-shot prompting gives basic but incomplete logic.

## Question 2: One-Shot Prompting – Factorial Calculation

**Prompt Used:** Example: 5 → 120

**AI-Generated Code:**

```
def factorial(n):
    if n < 0:
        return "Invalid input"
    result = 1
    for i in range(1, n + 1):
        result *= i
    return result
```

**Testing (Input / Output):**

Input	Output
5	120
0	1
1	1
-3	Invalid input

**Observations:** Negative input handled, logic is clearer.

**Conclusion:** One-shot prompting improves correctness.

## Question 3: Few-Shot Prompting – Armstrong Number Check

**Prompt Used:** 153 → Armstrong, 370 → Armstrong, 123 → Not Armstrong

**AI-Generated Code:**

```
def is_armstrong(num):
```

```

if num < 0:
    return "Invalid input"
digits = str(num)
power = len(digits)
total = 0
for d in digits:
    total += int(d) ** power
return "Armstrong Number" if total == num else "Not an Armstrong Number"

```

**Testing (Input / Output):**

Input	Output
153	Armstrong
370	Armstrong
123	Not Armstrong
0	Armstrong
-10	Invalid

**Observations:** Examples helped correct logic and structure.

**Conclusion:** Few-shot prompting improves accuracy.

## Question 4: Context-Managed Prompting – Number Classification

**Prompt Used:** Classify number as Prime, Composite or Neither.

**AI-Generated Code:**

```

def classify_number(n):
    if not isinstance(n, int):
        return "Invalid input"
    if n <= 1:
        return "Neither Prime nor Composite"
    for i in range(2, int(n ** 0.5) + 1):
        if n % i == 0:
            return "Composite"
    return "Prime"

```

**Testing (Input / Output):**

Input	Output
2	Prime
9	Composite
1	Neither
-5	Neither
7	Prime

**Observations:** Efficient sqrt logic used.

**Conclusion:** Context-managed prompting gives optimized code.

## Question 5: Zero-Shot Prompting – Perfect Number Check

**Prompt Used:** Write a Python function to check perfect number.

**AI-Generated Code:**

```
def is_perfect(num):
```

```

if num <= 0:
    return False
total = 0
for i in range(1, num):
    if num % i == 0:
        total += i
return total == num

```

**Testing (Input / Output):**

Input	Output
6	True
28	True
12	False
1	False

**Observations:** Correct but inefficient for large inputs.

**Conclusion:** Zero-shot lacks optimization.

## Question 6: Few-Shot Prompting – Even or Odd with Validation

**Prompt Used:** 8 → Even, 15 → Odd, 0 → Even

**AI-Generated Code:**

```

def even_or_odd(n):
    if not isinstance(n, int):
        return "Invalid input"
    return "Even" if n % 2 == 0 else "Odd"

```

**Testing (Input / Output):**

Input	Output
8	Even
15	Odd
0	Even
-4	Even
3.5	Invalid

**Observations:** Input validation and clarity improved.

**Conclusion:** Few-shot prompting improves output consistency.

## Overall Conclusion

Prompt engineering strongly influences AI-generated code quality. Zero-shot is basic, one-shot improves safety, few-shot improves accuracy, and context-managed prompting produces optimized solutions.