**Lab Exercise 3- Polymorphism in Python**

Here's a lab exercise that demonstrates polymorphism in Python with an example related to a library management system:

**Lab Exercise: Polymorphism in Python - Library Management System**

**Step 1: Create a Parent Class**

class LibraryItem:

def \_\_init\_\_(self, title, author):

self.title = title

self.author = author

def display\_info(self):

pass

def check\_availability(self):

pass

**Step 2: Create Child Classes with Overridden Methods**

class Book(LibraryItem):

def \_\_init\_\_(self, title, author, ISBN):

super().\_\_init\_\_(title, author)

self.ISBN = ISBN

def display\_info(self):

print(f"Book Title: {self.title}, Author: {self.author}, ISBN: {self.ISBN}")

def check\_availability(self):

return "Available"

class Magazine(LibraryItem):

def \_\_init\_\_(self, title, author, issue\_number):

super().\_\_init\_\_(title, author)

self.issue\_number = issue\_number

def display\_info(self):

print(f"Magazine Title: {self.title}, Author: {self.author}, Issue Number: {self.issue\_number}")

def check\_availability(self):

return "Available"

class ReferenceItem(LibraryItem):

def \_\_init\_\_(self, title, author, reference\_number):

super().\_\_init\_\_(title, author)

self.reference\_number = reference\_number

def display\_info(self):

print(f"Reference Title: {self.title}, Author: {self.author}, Reference Number: {self.reference\_number}")

def check\_availability(self):

return "For reference only"

**Step 3: Demonstrate Polymorphism**

# Demonstrate polymorphism

library\_items = [

Book("The Catcher in the Rye", "J.D. Salinger", "0316769487"),

Magazine("National Geographic", "Various", "October 2023"),

ReferenceItem("Encyclopedia Britannica", "Various", "REF123")

]

for item in library\_items:

item.display\_info()

print(f"Availability: {item.check\_availability()}\n")

**Conclusion**

This exercise demonstrated polymorphism in Python using a complex example related to a library management system. The LibraryItem class served as the parent class, and the Book, Magazine, and ReferenceItem classes served as the child classes that inherited from the LibraryItem class and implemented their own versions of the display\_info and check\_availability methods. Experiment further with polymorphism and explore more complex scenarios to deepen your understanding of polymorphism in Python.