Homework #7

01286121 Computer Programming

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By

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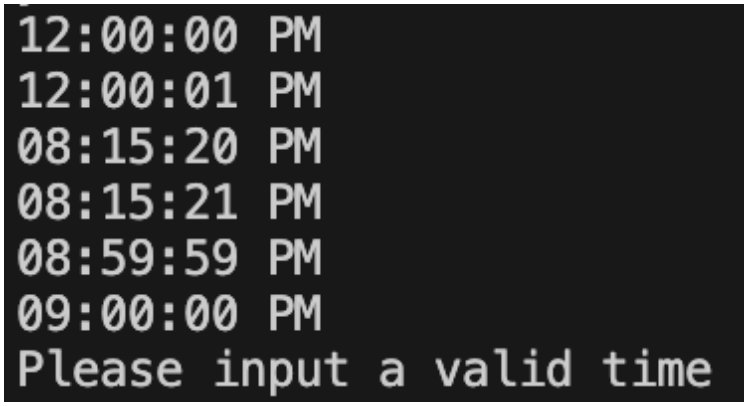
1.

Code:

```
class Clock(object):
    def __init__(self, hour, minute, second):
        self.hour = hour
        self.minute = minute
        self.second = second

    def set_time(self, hour = 0, minute = 0, second = 0):
        if 24 > hour >= 0 and 60 > minute >= 0 and 60 > second >= 0:
            self.hour = hour
            self.minute = minute
            self.second = second
        else:
            return print("Please input a valid time")

    def get_time(self):
        return (self.hour, self.minute, self.second)

    def tick(self):
        self.second += 1

        if self.second >= 60:
            self.second = 0
            self.minute += 1
        if self.minute >= 60:
            self.minute = 0
            self.hour += 1
        if self.hour >= 24:
            self.hour = 0

    def display(self):
        if self.hour == 0:
            hour = 12
            period = "AM"
        elif self.hour < 12:
            hour = self.hour
            period = "AM"
```

```
        elif self.hour == 12:
            hour = 12
            period = "PM"
        else:
            hour = self.hour - 12
            period = "PM"
        print(f"{hour:02}:{self.minute:02}:{self.second:02} {period}")

#Testing
time = Clock(12, 0, 0)
time.get_time()
time.display()

time.tick()
time.display()

time.set_time(20, 15, 20)
time.get_time()
time.display()

time.tick()
time.display()

time.set_time(20, 59, 59)
time.get_time()
time.display()

time.tick()
time.display()

time.set_time(26, 68, 18)
```

Result:



2.

Code:

```
class Poly(object):
    def __init__(self, co):
        self.co = list(co)

    def add(self, p):
        max_len = max(len(self.co), len(p.co))
        new = [0] * max_len
        for i in range(len(self.co)):
            new[i] += self.co[i]
        for i in range(len(p.co)):
            new[i] += p.co[i]
        return Poly(tuple(new))

    def scalar_multiply(self, n):
        return Poly(tuple(c * n for c in self.co))
```

```
def multiply(self, p):
    new = [0] * (len(self.co) + len(p.co) - 1)
    for i1, x1 in enumerate(self.co):
        for i2, x2 in enumerate(p.co):
            new[i1 + i2] += x1 * x2 #i1 + i2 is for the x^ and x1* x2 is for the num

    return Poly(tuple(new))

def power(self, n):
    result = Poly((1,))
    if n >= 0:
        for i in range(n):
            result = result.multiply(self)
    return result

def diff(self):
    if len(self.co) == 1:
        return Poly((0,))
    new = [i * c for i, c in enumerate(self.co)][1:]
    return Poly(tuple(new))

def integrate(self):
    new = [0] * (len(self.co) + 1)
    for i, c in enumerate(self.co):
        new[i + 1] = c / (i + 1)
    return Poly(tuple(new))

def eval(self, n):
    return sum(c * (n ** p) for p, c in enumerate(self.co))

def print(self):
    terms = []
    for p, c in enumerate(self.co):
        if c == 0:
            continue
        if p == 0:
            terms.append(str(c))
        elif p == 1:
            terms.append(f"{'+ ' if c > 0 else ''}{c}x")
```

```
            else:
                terms.append(f"{'+ ' if c > 0 else '}{c}x^{p}")
        string = " ".join(terms)
        string = string.replace("+ -", "- ")
        print(string if string else "0")

#Testing
p = Poly((1, 0, -2))
p.print()

q = p.power(2)
q.print()

print(p.eval(3))

r = p.add(q)
r.print()

r.diff().print()
```

Result:

```
1 -2x^2
1 -4x^2 + 4x^4
-17
2 -6x^2 + 4x^4
-12x + 16x^3
```

3.

Code:

```
class LinearEquation(object):
    def __init__(self, a, b, c, d, e, f):
        self.__a = a
        self.__b = b
        self.__c = c
        self.__d = d
        self.__e = e
        self.__f = f

    def get_a(self): return self.__a

    def get_b(self): return self.__b

    def get_c(self): return self.__c

    def get_d(self): return self.__d

    def get_e(self): return self.__e

    def get_f(self): return self.__f

    def isSolvable(self):
        if (self.__a * self.__d) - (self.__b * self.__c) == 0:
            return False
        else:
            return True

    def getX(self):
        if self.isSolvable() == False:
            return print("This equation is not solvable.")
        else:
            return ((self.__e * self.__d) - (self.__b * self.__f)) / ((self.__a * self.__d) - (self.__b * self.__c))

    def getY(self):
        if self.isSolvable() == False:
            return print("This equation is not solvable.")
        else:
            return ((self.__a * self.__f) - (self.__e * self.__c)) / ((self.__a * self.__d) - (self.__b * self.__c))

equation = LinearEquation(2, 3, 1, 2, 13, 8)
```

```
print("x =", equation.getX())
print("y =", equation.getY())
```

Result: