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Reg no: FA20-BSE-029

Subject: Artificial Intelligence

Question 1:

___Create two lists based on user values. Merge both the lists and display in sorted order.

```
In [3]: l1 = [1, 2, 3, 4, 5, 6]
        l2 = [12, 8, 9, 10, 11, 7]
        l1.extend(l2)
        l1.sort()

        print(l1)

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]
```

Question 2:

___Find the smallest and largest value in list used in above question

```
In [4]: l1 = [1, 2, 3, 4, 5, 6]
        l2 = [12, 8, 9, 10, 11, 7]
        l1.extend(l2)
        l1.sort()

        print(l1)
        print(f'Max value in List = {max(l1)}')
        print(f'Min value in List = {min(l1)}')
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]
Max value in List = 12
Min value in List = 1
```

Question 3:

___Prove the theorem:

___ $\frac{d}{dx}(\sin x) = \cos(x)$

where

$\frac{d}{dx}(\sin x) = \frac{\sin(x+h) - \sin(x)}{h}$

```
In [27]: from math import *
h = 0.001
negX = -round(pi, 2)
posX = round(pi, 2)

while negX != posX:
    cs = round(cos(negX), 2)
    sn = (sin(negX+h) - sin(negX))
    sn = round(sn/h, 2)
    if(cs != sn):
        print(f'd/dx(sin(x)) = {sn}')
        print(f'd/dx(cos(x)) = {cs}\n')

    negX += 0.001
negX = round(negX, 3)
```

$$\begin{aligned}d/dx(\sin(x)) &= -0.79 \\d/dx(\cos(x)) &= -0.8\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= -0.42 \\d/dx(\cos(x)) &= -0.43\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= -0.28 \\d/dx(\cos(x)) &= -0.29\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.33 \\d/dx(\cos(x)) &= 0.32\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.45 \\d/dx(\cos(x)) &= 0.44\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.52 \\d/dx(\cos(x)) &= 0.51\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.65 \\d/dx(\cos(x)) &= 0.64\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.68 \\d/dx(\cos(x)) &= 0.67\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.73 \\d/dx(\cos(x)) &= 0.72\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.77 \\d/dx(\cos(x)) &= 0.76\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.93 \\d/dx(\cos(x)) &= 0.92\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.99 \\d/dx(\cos(x)) &= 1.0\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.74 \\d/dx(\cos(x)) &= 0.75\end{aligned}$$

$$\begin{aligned}d/dx(\sin(x)) &= 0.56 \\d/dx(\cos(x)) &= 0.57\end{aligned}$$

$$d/dx(\sin(x)) = 0.31$$

$$d/dx(\cos(x)) = 0.32$$

$$d/dx(\sin(x)) = -0.3$$

$$d/dx(\cos(x)) = -0.29$$

$$d/dx(\sin(x)) = -0.51$$

$$d/dx(\cos(x)) = -0.5$$

$$d/dx(\sin(x)) = -0.96$$

$$d/dx(\cos(x)) = -0.95$$

In []:

In []:

In []: