# Automated Report

This report was automatically generated by executing `./automate`. The executable `automate` was created by compiling `automate.f95` using the `gfortran` compiler:

```
gfortran automate.f95 -o automate
```

To create Table 1, `automate` outputs the `.tex` file `table.tex` that is input to this document. To plot the graphs $y = \sin x$ and $y = \cos x$, `automate` outputs the data file `figure.dat` and calls the gnuplot script `automate.plt` that plots the data.

Table 1 lists values of $\sin x$ and $\cos x$ at $x = i\frac{\pi}{5}$ for $i = 0, 1, 2, \ldots, 10$.

| $x$ | $\sin x$ | $\cos x$ |
|---|---|---|
| 0.00000000 | 0.00000000 | 1.00000000 |
| 0.628318548 | 0.587785244 | 0.809017003 |
| 1.25663710 | 0.951056540 | 0.309016973 |
| 1.88495576 | 0.951056480 | -0.309017152 |
| 2.51327419 | 0.587785184 | -0.809017062 |
| 3.14159274 | -8.74227766E-08 | -1.00000000 |
| 3.76991153 | -0.587785542 | -0.809016764 |
| 4.39822960 | -0.951056480 | -0.309017092 |
| 5.02654839 | -0.951056480 | 0.309017122 |
| 5.65486670 | -0.587785304 | 0.809016943 |
| 6.28318548 | 1.74845553E-07 | 1.00000000 |

Table 1: Values of $\sin x$ and $\cos x$.

Figure 1 plots the values of $\sin x$ and $\cos x$ at $x = i\frac{\pi}{5}$ for $i = 0, 1, 2, \ldots, 10$.

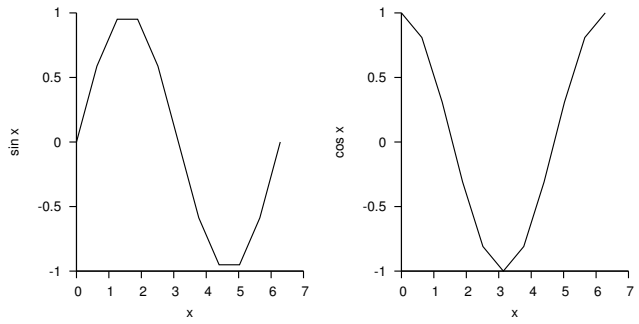


Figure 1: Plots of $y = \sin x$ and $y = \cos x$.

The source code for `automate.f95` is listed as follows.

automate.f95

```
1  program automate
2  implicit none
3     integer :: i
4     real :: x(0:10) ! an array indexed from 0 to 10
5     ! compute pi and store as a constant
6     real, parameter :: pi = 2.*acos(0.)
7
8     ! populate array of x-values between 0 and 2 pi
9     x=(/(i/5.*pi,i=0,10)/)
10
```

```
   ! write sine and cosine data to file 'figure.dat'
   open(10,file='figure.dat',action='write',status='replace')
   do i=0,10
      write(10,*) x(i), sin(x(i)), cos(x(i))
   enddo
   close(10)
   ! call gnuplot script 'automate.plt' that plots data
   call execute_command_line('gnuplot automate.plt', wait=.true.)

   ! write LaTeX table to file 'table.tex'
   open(10,file='table.tex',action='write',status='replace')
   write(10,*) '\begin{tabular}{|c|c|c|} \hline'
   write(10,*) '$x$ & $\sin x$ & $\cos x$ \\ \hline'
   do i=0,10
      write(10,*) x(i), '&', sin(x(i)), '&', cos(x(i)), '\\'
   enddo
   write(10,*)'\hline \end{tabular}'
   close(10)
   ! call pdflatex on 'automate.tex' to compile report to pdf
   call execute_command_line('pdflatex automate.tex', wait=.true.)
end program automate
```