There are three parts one can use for the covid simulation: demo_model.py, demo_problem.py, demo_problem_solver.py.
To run this covid.py, need to add the covid model and problem class to directory first.

One can use demo_model to run the model class (COVID_vac) in covid.py. All the default initial values for parameters in model case can be tuned here. Here is an example about how to run the demo_model.py for covid. (Can add the following lines to the demo_model file):

```
from simopt.models.covid import COVID_vac    #combined case

#Give an initial solution
group = np.array([8123, 4921, 3598])
vac_cap = 8888
v1 = 0.8
# v2 = 0.89
v2 = (8888-group[0]*v1)/group[1]
v3 = (8888-group[0]*v1-group[1]*v2)/group[2]

fixed_factors = {"freq_vac":(8/7, 8/7, 8/7, v1,v2,v3),"inter_rate":(10.58, 5, 2, 4, 6.37, 3, 6.9, 4, 2)}

# Can change the default value of parameters by assigning them new values in the fixed_factors
mymodel = COVID_vac(fixed_factors)
```

One can use demo_problem to run the problem class for multiple replications. One can tune the default parameter values by modifying the fixed_factors and can choose the number of replications want to run by changing the “n_reps” in the demo_problem. Here is an example for the demo_problem for COVID.

```
from simopt.models.covid import CovidMinInfectVac

fixed_factors = {"initial_solution": (1/2,1/3,1/4), "budget": 1200}
myproblem = CovidMinInfectVac(fixed_factors)
x = (0,0,0,0.97,0,0)  # initial solution for decision variable
mysolution = Solution(x, myproblem)
```

demo_problem_solver.py is the file that one can use to solve the problem. The COVID problem uses random search solver.

```
solver_name = "RNDSRCH"  # Random search solver
problem_name = "VAC-1"  # Continuous newsvendor problem
```