Assignment Group A 3

Aim

To understand the concept of Coverage and how to calculate it using MPI program

Problem Statement

Write a MPI program for calculating a quantity called coverage from data files.

Input

python programs at different nodes of single cluster.

Output

Coverage report of all nodes data files execution at one node in single cluster.

Theory

MPI program

MPI is a library of routines that can be used to create parallel programs. MPI is designed to allow users to create programs that can run efficiently on most parallel architectures. MPI can also support distributed program execution on heterogeneous hardware. That is, you may run a program that starts processes on multiple computer systems to work on the same problem.

Introduction of Coverage

Coverage is a tool for measuring code coverage of Python programs. It monitors your program, noting which parts of the code have been executed, then analyzes the source to identify code that could have been executed but was not.
Coverage measurement is typically used to gauge the effectiveness of tests. It can show which parts of your code are being exercised by tests, and which are not.

Installation of Coverage

Installing coverage.py is done in the usual ways. The simplest way is with pip:
$ pip install coverage

Coverage.py Command Line Usage

- run - Run a Python program and collect execution data.
- report - Report coverage results.
- html - Produce annotated HTML listings with coverage results.
- xml - Produce an XML report with coverage results.
- annotate - Annotate source files with coverage results.
- erase - Erase previously collected coverage data.
- combine - Combine together a number of data files.
- debug - Get diagnostic information.

Execution of Coverage.py:

You collect execution data by running your Python program with the run command:
$ coverage run my_program.py arg1 arg2

Mathematical Modeling

Let S be the system that represents the Eight Queens Algorithm.

Initially,

$$\mathbf{S} = \{\phi\}$$

Let,

$$\mathbf{S} = \{\mathbf{I, O, F}\}$$

Where,
I - Represents Input set
O - Represents Output set
F - Represents Function set

Input set - I:

$$\mathbf{I} = \{\mathbf{D}\}$$

Where,

- D - Represents the input from Data Files.

Output set - O:

$$\mathbf{O} = \{\mathbf{C}\}$$

Where,

- C - Represents the coverage quantity of the data given in the files..

Function Set - F:

$$\mathbf{F} = \{F_1, F_2, F_3, F_4, F_5, F_6\}$$

Where,

- F_1 - Represents a function that loads the location of data files.
  F_1(F, L) -> {F}

- F_2 - Represents a function for calculating coverage.
  F_2(L, L_s, R, P) -> {C}
- F_3 - Represents a function for calculating coverage one data set at a time.
  $F_3(O_{p1}, I_m, N_m)$ -> {C}
- F_4 - Represents a function for calculating coverage two data set at a time.
  $F_4(O_{1p}, O_{p2}, I_m, N_m)$ -> {C}
- F_5 - Represents a function for calculating coverage three data set at a time.
  $F_5(O_{p1}, O_{p2}, O_{p3}, I_m, N_m)$ -> {C}
- F_6 - Represents a function for calculating coverage four data set at a time.
  $F_6(O_{p1}, O_{p2}, O_{p3}, O_{p4}\ I_m, N_m)$ -> {C}

Conclusion

Thus, we have studied and implemented MPI program for calculating a quantity called coverage from data files.