MCQ Questions - GProf

1. What does gprof stand for?
   A) GNU Profiler
   B) General Profiler
   C) Graph Profiler
   D) GNU Graph Profiler

2. Which flag is used to compile a program with gprof?
   A) -gp
   B) -p
   C) -pg
   D) -g

3. What is the name of the file where profiling data is written?
   A) gprof.out
   B) profile.out
   C) data.out
   D) gmon.out

4. What command is used to generate the profiling report in gprof?
   A) gprof -r
   B) gprof my_application gmon.out > analysis.txt
   C) gprof -o analysis.txt
   D) gprof -g gmon.out

5. Which of the following is NOT part of the flat profile provided by gprof?
   A) Self time
   B) Total time
   C) Memory usage
   D) Call counts

6. What does 'self time' represent in gprof's report?
   A) Time spent in the function itself
   B) Time spent in functions called by the function
   C) Time spent on I/O operations
   D) Total time of program execution

7. In the call graph, what does 'children time' indicate?
   A) Time spent in the function alone
   B) Time spent in functions called by this function
   C) Total time of program execution

D) Time spent on memory allocation

8. What is the primary purpose of gprof in High-Performance Computing (HPC)?
A) Debugging
B) Code optimization
C) Memory analysis
D) Security analysis

9. Which command adds additional instructions to the executable for profiling?
A) gcc -p
B) gcc -pg
C) gcc -g
D) gcc -o

10. What is the output of the command `gcc -pg -o my_application my_application.c`?
A) A source file
B) An executable file with profiling enabled
C) A binary file without profiling
D) A profiling report

11. Which section of the gprof report shows the relationship between functions?
A) Flat profile
B) Call graph
C) Summary
D) Execution log

12. What information does the call count provide in gprof's flat profile?
A) The amount of memory used by each function
B) The number of times each function was called
C) The time spent in each function
D) The size of each function in bytes

13. What must be done before running the gprof command to generate the profiling report?
A) Compile the program with -pg flag
B) Create a gmon.out file manually
C) Install additional libraries
D) Run the program with -pg flag

14. What file extension is commonly used for the profiling data file generated by gprof?

A) .prof
B) .data
C) .gprof
D) .out

15. Which gprof report section can help identify which functions need optimization?
A) Flat profile
B) Summary
C) Memory usage
D) Execution log

16. What command should be used to compile a program for gprof profiling in C?
A) gcc -pg -o my_application my_application.c
B) gcc -g -o my_application my_application.c
C) gcc -p -o my_application my_application.c
D) gcc -o my_application my_application.c

17. What does the `gprof my_application gmon.out > analysis.txt` command do?
A) Runs the program
B) Compiles the program
C) Generates a human-readable profiling report
D) Analyzes memory usage

18. Which profiling report element shows how much time is spent in subroutines?
A) Flat profile
B) Call graph
C) Summary
D) Execution log

19. What does 'total time' in the flat profile refer to?
A) Time spent in the function itself
B) Time spent in the function and its descendants
C) Time spent on I/O operations
D) Total program execution time

20. Which gprof feature helps in understanding function call relationships?
A) Flat profile
B) Call graph
C) Memory usage report
D) Execution log

21. What is the first step in using gprof for profiling a program?

A) Running the program
B) Compiling the program with -pg flag
C) Generating the profiling report
D) Analyzing the profiling data

22. What is the role of instrumentation in gprof profiling?
A) To add additional instructions for performance data collection
B) To optimize the code automatically
C) To analyze memory usage
D) To debug the program

23. Which of the following commands runs an instrumented program to collect profiling data?
A) ./my_application
B) gcc -pg -o my_application my_application.c
C) gprof my_application gmon.out > analysis.txt
D) gprof -r my_application

24. What information is crucial for optimizing code in HPC environments according to gprof?
A) Execution time of functions and their calling relationships
B) Memory allocation details
C) Number of I/O operations
D) Size of executable files

25. Why is the call graph important in the gprof report?
A) It shows memory usage
B) It shows how functions call one another and the time spent in these calls
C) It provides a summary of the program
D) It lists all the variables used in the program

26. Which type of time in the call graph is spent in the function alone?
A) Children time
B) Self time
C) Total time
D) Cumulative time

27. What command is used to compile a C program with profiling enabled?
A) gcc -pg -o my_application my_application.c
B) gcc -g -o my_application my_application.c
C) gcc -p -o my_application my_application.c
D) gcc -o my_application my_application.c -pg

28. Which report helps identify the time spent in each function during a program's execution in gprof?

A) Execution log
B) Call graph
C) Memory usage
D) Flat profile
Answer: D) Flat profile