

```

#include <stdio.h>
#include <time.h>
#include <math.h>

int cachelevel() {
    int steps = 1024 * 1024 * 1024, i;
    int array[1024 * 1024];
    int lengthMod = (1024 * 1024) - 1;

    for (i = 0; i < steps; i++) {
        array[(i * 16) & lengthMod]++;
    }
    return 0;
}

int bandwidth() {
    int sum = 0, k = 1, mul = 1, j = 1;
    while(k <= 1024 * 1024 * 1024)
    {
        sum = sum + k;
        mul = mul * sum;
        j = j * k;
        k++;
    }
    return 0;
}

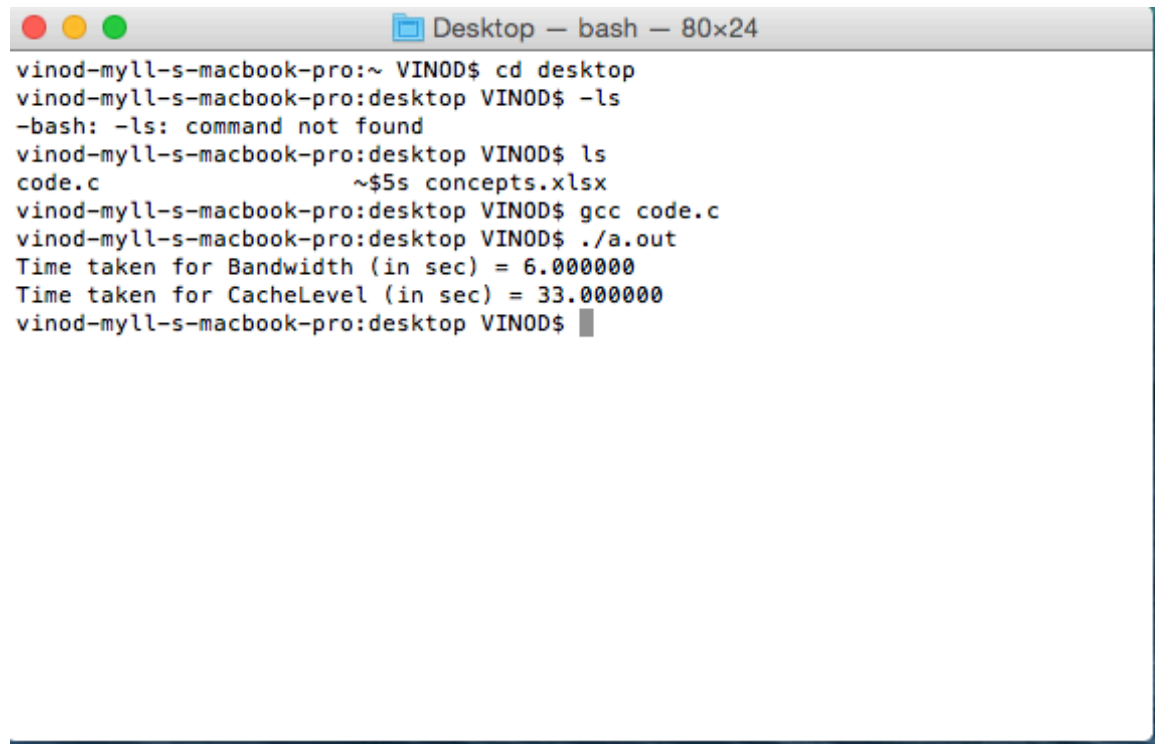
int main() {
    double totalTimeTaken;
    time_t startTime, endTime;

    startTime = (double) clock() / (double)CLOCKS_PER_SEC;
    bandwidth();
    endTime = (double) clock() / (double)CLOCKS_PER_SEC;
    totalTimeTaken = endTime - startTime;
    printf("Time taken for Bandwidth (in sec) = %f \n",
totalTimeTaken);

    startTime = (double) clock() / (double)CLOCKS_PER_SEC;
    cachelevel();
    endTime = (double) clock() / (double)CLOCKS_PER_SEC;
    totalTimeTaken = endTime - startTime;
    printf("Time taken for CacheLevel (in sec) = %f \n",
totalTimeTaken);
}

```

OUTPUT:

A screenshot of a macOS terminal window titled "Desktop — bash — 80x24". The window shows a series of commands and their outputs. The user navigates to the desktop directory, attempts to use the -ls option (which fails), lists files, compiles a C program, and runs it. The output of the program shows two timing measurements: 6.000000 seconds for Bandwidth and 33.000000 seconds for CacheLevel.

```
vinod-myll-s-macbook-pro:~ VINOD$ cd desktop
vinod-myll-s-macbook-pro:desktop VINOD$ -ls
-bash: -ls: command not found
vinod-myll-s-macbook-pro:desktop VINOD$ ls
code.c                               ~$5s  concepts.xlsx
vinod-myll-s-macbook-pro:desktop VINOD$ gcc code.c
vinod-myll-s-macbook-pro:desktop VINOD$ ./a.out
Time taken for Bandwidth (in sec) = 6.000000
Time taken for CacheLevel (in sec) = 33.000000
vinod-myll-s-macbook-pro:desktop VINOD$
```