

## Ex05\_p01

- To compare the CPU time of writing the array to a file unformatted and formatted I used two functions, *write\_formatted* and *write\_unformatted*. When testing I compiled both programs with -O0 and -O3 and then executed them n=100 times using the shell script *script.sh*. Finally I used the program *medians.c* to calculate the averages.

*p01\_formatted.c*

```
double write_formatted(float* a, int sz)
{
    clock_t start, end;
    double cpu_time_used;
    FILE* file = fopen("p01_formatted.txt", "w");
    if (file != NULL) {
        start = clock();
        for (int i = 0; i < sz; i++) {
            fprintf(file, "%g", a[i]);
        }
        end = clock();
        cpu_time_used = ((double) (end - start)) /
CLOCKS_PER_SEC;
        fclose(file);
    }

    return cpu_time_used;
}
```

*p01\_unformatted.c*

```
double write_unformatted(float* a, int sz)
{
    clock_t start, end;
    double cpu_time_used;
    FILE* file = fopen("p01_unformatted.datc", "w");
    if (file != NULL) {
        start = clock();
        for (int i = 0; i < sz; i++) {
            fwrite((void*) &a[i], sizeof(a[i]),
1, file);
        }
        end = clock();
        cpu_time_used = ((double) (end - start)) /
CLOCKS_PER_SEC;
        fclose(file);
    }
}
```

```
        return cpu_time_used;
    }
```

### **Results:**

- As one can see from the output of *medians.c* the CPU time required to write the array, formatted, to aa file takes significantly longer than when writing it unformatted to a file. Another thing to note is that compiler optimisation had very little effect on the CPU time.

#### *Output from medians.c*

Average of data/p01\_formatted\_00\_output.txt: 2.651592

Average of data/p01\_formatted\_03\_output.txt: 2.647093

Average of data/p01\_unformatted\_00\_output.txt: 0.146979

Average of data/p01\_unformatted\_03\_output.txt: 0.140988