

Practical Programming Test 1

Session B
14 March 2019


Name: _____

Student number: _____

Instructions

- The test sheet should **Not Be Taken Away**.
- Please write your name and student number in the space indicated and hand this in before you leave. This sheet will be used as proof of having taken the test.
- You have 90 minutes to complete and submit your solutions (including online submission). The first 5 minutes will be reading time.
- Failure to submit before the deadline will be treated as a failed practical programming test and will be awarded a score of 0.
- Your **submission** will consist **only** of your source code files i.e.
 - `yourFileName.cpp`
- Submissions are made using Sakai: <https://cle.wits.ac.za/portal/site/ELEN2004>. The submission link is found under **Assignments**. You are allowed only 3 attempts. Your submission should appear as follows on Sakai

Attachments

 `main.cpp` (1 KB; Mar 17, 2018 2:49 pm) [Remove](#)

Select more files from computer

No file chosen

- Make sure that you receive the submission confirmation email.
- Your solution will be assessed on
 - coding style,
 - simplicity,
 - use of comments,
 - clarity,
 - ability to compile, run and generate correct output.

The solution must comply exactly with the specifications and requirements given in the problem definition.

- **Important:** You may not make use of cell-phones and the computer network (except for the Practical Programming Submission area) during the test. You must make sure you behave in a professional and ethical manner. All network activities will be logged. Any student caught behaving unethically will fail the practical programming component and may face disciplinary action.

Task

Consider the following series:

$$\sum_{n=1}^K \frac{(-1)^n(2n+1)}{2^n} = -\frac{3}{2} + \frac{5}{4} - \frac{7}{8} + \frac{9}{16} - \dots \quad (1)$$

Write a program that can read a list of numbers, K , from a text file called `input.txt`. For each value in the input file, write the sum of the first K numbers in the series to a text file called `output.txt`. The values of the sum must be accurate to three decimal places.

Hint: make use of functions (however this is not a requirement)! For example `power` and `sumSeries` may be useful functions to implement. Test each of your functions individually before trying to test if your whole program works.

NB: You may not make use of standard library routines or third party APIs to perform the mathematical calculation. You may not make use of the `cmath` library's power function, `pow`.

Example 1

Listing 1: `input.txt`

```
1 4
2 1
3 3
4 18
```

Listing 2: `output.txt`

```
1 -0.562
2 -1.500
3 -1.125
4 -0.778
```

Example 2

Listing 3: `input.txt`

```
1 1
2 2
3 3
4 4
5 5
6 6
7 7
8 8
9 9
10 10
11 99
```

Listing 4: output.txt

```
1 -1.500
2 -0.250
3 -1.125
4 -0.562
5 -0.906
6 -0.703
7 -0.820
8 -0.754
9 -0.791
10 -0.771
11 -0.778
```

Code planning

Code planning (continued)