PROG71985 – Winter 2019

Code Revision Assignment #3

Files Everywhere Inc. is a company that specializes in the ability to create software whose data can be shared by everyone (platform agnostic). Usually, all of their software has been designed using ASCII (text) file formats, such as CSV or XML, however, they recently decided to experiment with binary file formats to avoid the expense of having to format or interpret data being written or read.

One of their previous co-op students designed a program, "binarydata.c" which was meant to output a binary file using this format:

```
[bits 8 to 15 of magic][bits 0 to 7 of magic][bits 8 to 15 of command][bits 0 to 7 of command][bits 24 to 31 of data][bits 16 to 23 of data][bits 8 to 15 of data][bits 0 to 7 of data][checksum as 8 bits]
```

The output file must have 9 bytes in total.

The co-op, unfortunately, had limited understanding of binary files, and the issues posed by different CPU architectures (little endian versus big endian). The file specification above is in big endian format (high bytes of 16 / 32 bit values are written or read before the lower bytes). The solution as designed does not support the company's goals of being platform agnostic.

Assignment Requirements

Review the source code provided for Code Revision Assignment #3 ("binarydata.c"), and perform the following maintenance work:

1) There are a three "TODO" items the previous programmer had left in the source code that they were unable to correct due to limitations in their knowledge base. As a Conestoga trained software developer, you have the knowledge to solve these issues. Update the source code with the required code for the TODO items. These are:
    a. Command line interface (argc, argv[] for main()).
    b. Checksum algorithm.
    c. Platform agnostic output.

2) There is a glaring runtime problem with the code as written when it comes to file processing. Analyze and correct this problem!

3) Clean up the coding style to conform to OTBS standard.

Deliverables

At the due date, in the drop box provided, submit:

a) Revised source code

Marking Scheme

This assignment will be graded out of 10 points, as follows:

Command line interface to replace interactivity – 3 points

- 0 = not attempted, missing
- 1 = attempted, but command line processing not working correctly
- 2 = attempted, but only works if all required command line arguments are present, and fails if any values are missing
- 3 = command line interface working as required, including error handling of insufficient or extra arguments

Checksum solution – 2 points

- 0 = not attempted, missing
- 1 = attempted, but checksum algorithm does not provide expected value
- 2 = attempted, and algorithm works as expected

Platform Agnostic output – 2 points

- 0 = not attempted, missing
- 1 = attempted, but file output not fully in big endian format
- 2 = attempted, and output is correctly saved in big endian format

Professionalism in Software Engineering – 2 points:

- 0 = no source code provided to evaluated, or code unable to compile
- 1 = code has been provided, compiles, but not in any discernable style, not using template
- 2 = code has adequate comments, a reasonable attempt at OTBS coding style is evident
- 3 = exemplary code that is fully documented (header comment block, function comment block, in-line comments explaining code, required OTBS coding style used throughout)

Correct Implementation – maximum 1 points deducted for correction of error noted above

Appendix A – Graduate Attributes

Professional Body of Knowledge

KB	KB 1	KB 2	PA	PA 1	PA 2	PA 3	IV	IV 1	IV 2	IV 3	ED	ED 1	ED 2	ED 3	ED 4	ED 5	ET	ET 1	ET 2	ET 3	ET 4
Knowledge base	Facts	Concepts	Problem analysis	Decomposition	Methodology	Validation	Investigation	Research	Measure	Experiment	Design	Problem Def'n &	Preliminary Design	Detailed Design	Implementation	Verification & Valid'n	Use of engineering	Models/Simulations	Measurement Tools	Manufacturing Tools	CAD Systems
	D	D										D A	D A	D A	D A	D A				D A	

Employability Skills

TM	TM1	TM2	TM3	CM	CM1	CM2	PR	PR1	PR2	PR3	PR4	LL	LL1	LL2	LL3	LL4
Individual and team work	Personal Contribution	Collaboration	Infrastructure	Communication skills	Log Engineering Info	Convey Engineering Info	Professionalism	Work Ethic	Professional Conduct	Professional Contribution	Professional Practice	Life-long learning	Autonomous Learning	Applying Knowledge & Skills	Self Direction & Reflection (Metalearning)	Learning Strategies (Metacognition)
	A							D	D		D				D	

Professional Responsibility

SC	SC1	SC2	SC3	EE	EE1	PM	PM1	PM2	PM3	PM4	PM5
Impact on society and the environment	Environmental Awareness	Product Life Cycle	Balance & Tradeoff	Ethics and equity	Ethical Responsibility	Economics and project management	Project Scheduling	Resource Allocation & Costing	Risk Management	Business Planning	Economic Analysis

LEGEND		
I	**Introduced**	first experience/use
D	**Developed**	continued experience/use
A	**Applied**	integration/extension of knowledge & skills