

Assignment 2B (40 marks) – Lab Week Seven -- Solution*Task One – Part One Questions (18 marks)–Place your answers in the allocated space.*

| Line, Instruction | | Values present AFTER execution of Line, Instruction | | | | | | | |
|-------------------|------------------------|---|------|------|--------|--------|--------|--------|--------|
| | | PC | A | B | D | \$1000 | \$1001 | \$1002 | \$1003 |
| 24 | ldaa #62 | \$2006 | \$62 | \$00 | \$6200 | \$17 | \$91 | -- | -- |
| 25 | ldab #62 | \$2008 | \$62 | \$3E | \$623E | \$17 | \$91 | -- | -- |
| 26 | adda MyArray | \$200B | \$79 | \$3E | \$793E | \$17 | \$91 | -- | -- |
| 27 | staa Result | \$200E | \$79 | \$3E | \$793E | \$17 | \$91 | \$79 | -- |
| 28 | stab Result+1 | \$2011 | \$79 | \$3E | \$793E | \$17 | \$91 | \$79 | \$3E |
| 29 | ldaa Result+1 | \$2014 | \$3E | \$3E | \$3E3E | \$17 | \$91 | \$79 | \$3E |
| 30 | ldab Result | \$2017 | \$3E | \$79 | \$3E79 | \$17 | \$91 | \$79 | \$3E |
| 31 | incb | \$2018 | \$3E | \$7A | \$3E7A | \$17 | \$91 | \$79 | \$3E |
| 32 | ldaa #%01010101 | \$201A | \$55 | \$7A | \$557A | \$17 | \$91 | \$79 | \$3E |
| 33 | std Result | \$201D | \$55 | \$7A | \$557A | \$17 | \$91 | \$55 | \$7A |

Task One – Part Two Questions (12 marks) – Place your answers in the allocated space.

| Question | Answer |
|---|---|
| a. How did \$1000 and \$1001 initially have their memory addresses filled with the indicated values at line 24? To answer this question, replicate the complete line of code that initialized those memory locations to the values indicated | MyArray db \$17, \$91 |
| b. What is the address associated with the label "MyArray"? | \$1000 |
| c. What is the address associated with the label "Result+1"? | \$1003 |
| d. Line 31 contains the instruction incb . What address holds the opcode for this instruction? | \$2017 |
| e. What is the opcode for incb ? | \$52 |
| f. What address mode is used in line 31? To answer this question, look up Increment B (INCB) in the HCS12 Assembly Language Reference Manual. Give both the full name and abbreviated name for the addressing mode. (2 marks) | Page 190 – INH Page 30 – Inherent |
| g. What address mode is used in line 33? To answer this question, look up Store Double Accumulator (STD). This instruction uses a Source Form of <i>opr16a</i> . Give both the full name and abbreviated name for the addressing mode. (2 marks) | Page 281 – EXT Page 30 – Extended |
| h. What high-level functionality is performed by program lines 27 – 30? (3 marks) | Swap the contents of Accumulator A and B |

Task Two – Number Conversions (10 marks) – Place your answers in the allocated space.

| Convert | To | Value |
|---------------------|-------------------------------------|-----------|
| \$A1 (unsigned) | Integer | 161 |
| \$A1 (signed) | Integer | -95 |
| \$1FFF | Integer | 8191 |
| 66 | Hexadecimal (signed 2's complement) | \$42 |
| -66 | Hexadecimal (signed 2's complement) | \$BE |
| -2 | Hexadecimal (signed 2's complement) | \$FE |
| 127 | Binary | %01111111 |
| -127 | Binary (signed 2's complement) | %10000001 |
| 11001101 (signed) | Integer | -51 |
| 11001101 (unsigned) | Integer | 205 |