COMP500 / ENSE501: Week 11 – Exercise:

EXERCISE NAME: *Binary Display*

Write a program that reads in a file and displays its contents. The program's output is to display the address offset of the file in a left hand column, followed by eight bytes of the file per row of output. Each byte in the file is to be displayed as a hexadecimal value, as well as the ASCII equivalent in brackets. The program must read the file specified by the user via a command line argument.

Any byte value less than ASCII `' '` (non-printable characters) must not be printed with brackets.

An example of the completed program's output when run with **`batman.bin`** is as follows:

```
0x00000000: 42 (B) 61 (a) 74 (t) 6D (m) 61 (a) 6E (n) 00     00
0x00000008: 00     00     00     00     00     00     00     00
0x00000010: 00     00     00     00     42 (B) 72 (r) 75 (u) 63 (c)
0x00000018: 65 (e) 20 ( ) 57 (W) 61 (a) 79 (y) 6E (n) 65 (e) 00
0x00000020: 00     00     00     00     00     00     00     00
```

An example of the completed program's output when run with **`random10.bin`** is as follows:

```
0x00000000: B8 (©) 17     00     00     28 (() 24 ($) 00     00
0x00000008: A2 (ó) 21 (!) 00     00     87 (ç) 1D     00     00
0x00000010: 3C (<) 17     00     00     EE (¯) 10     00     00
0x00000018: C9 (╔) 1B     00     00     08     05     00     00
0x00000020: 3D (=) 24 ($) 00     00     67 (g) 0E     00     00
```

An example of the completed program's output when run with **`sample.txt`** is as follows:

```
0x00000000: 23 (#) 69 (i) 6E (n) 63 (c) 6C (l) 75 (u) 64 (d) 65 (e)
0x00000008: 20 ( ) 3C (<) 73 (s) 74 (t) 64 (d) 69 (i) 6F (o) 2E (.)
0x00000010: 68 (h) 3E (>) 0D     0A     0D     0A     69 (i) 6E (n)
0x00000018: 74 (t) 20 ( ) 6D (m) 61 (a) 69 (i) 6E (n) 28 (() 76 (v)
0x00000020: 6F (o) 69 (i) 64 (d) 29 ()) 0D     0A     7B ({) 0D
0x00000028: 0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 69 (i) 6E (n) 74 (t)
0x00000030: 20 ( ) 65 (e) 78 (x) 61 (a) 6D (m) 70 (p) 6C (l) 65 (e)
0x00000038: 5B ([) 33 (3) 5D (]) 5B ([) 33 (3) 5D (]) 3B (;) 0D
0x00000040: 0A     0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 2F (/)
0x00000048: 2F (/) 20 ( ) 46 (F) 69 (i) 6C (l) 6C (l) 20 ( ) 74 (t)
0x00000050: 68 (h) 65 (e) 20 ( ) 61 (a) 72 (r) 72 (r) 61 (a) 79 (y)
0x00000058: 20 ( ) 77 (w) 69 (i) 74 (t) 68 (h) 20 ( ) 75 (u) 73 (s)
0x00000060: 65 (e) 72 (r) 20 ( ) 69 (i) 6E (n) 70 (p) 75 (u) 74 (t)
0x00000068: 3A (:) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 66 (f)
0x00000070: 6F (o) 72 (r) 20 ( ) 28 (() 69 (i) 6E (n) 74 (t) 20 ( )
0x00000078: 78 (x) 20 ( ) 3D (=) 20 ( ) 30 (0) 3B (;) 20 ( ) 78 (x)
0x00000080: 20 ( ) 3C (<) 20 ( ) 33 (3) 3B (;) 20 ( ) 2B (+) 2B (+)
0x00000088: 78 (x) 29 ()) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( )
0x00000090: 7B ({) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( )
```

```
0x00000098: 20 ( ) 20 ( ) 20 ( ) 66 (f) 6F (o) 72 (r) 20 ( ) 28 (()
0x000000A0: 69 (i) 6E (n) 74 (t) 20 ( ) 79 (y) 20 ( ) 3D (=) 20 ( )
0x000000A8: 30 (0) 3B (;) 20 ( ) 79 (y) 20 ( ) 3C (<) 20 ( ) 33 (3)
0x000000B0: 3B (;) 20 ( ) 2B (+) 2B (+) 79 (y) 29 ()) 0D     0A
0x000000B8: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( )
0x000000C0: 7B ({) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( )
0x000000C8: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 70 (p)
0x000000D0: 72 (r) 69 (i) 6E (n) 74 (t) 66 (f) 28 (() 22 (") 53 (S)
0x000000D8: 65 (e) 74 (t) 20 ( ) 25 (%) 64 (d) 2C (,) 20 ( ) 25 (%)
0x000000E0: 64 (d) 20 ( ) 74 (t) 6F (o) 3F (?) 20 ( ) 22 (") 2C (,)
0x000000E8: 20 ( ) 78 (x) 2C (,) 20 ( ) 79 (y) 29 ()) 3B (;) 0D
0x000000F0: 0A     0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( )
0x000000F8: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 73 (s)
0x00000100: 63 (c) 61 (a) 6E (n) 66 (f) 28 (() 22 (") 25 (%) 64 (d)
0x00000108: 22 (") 2C (,) 20 ( ) 26 (&) 65 (e) 78 (x) 61 (a) 6D (m)
0x00000110: 70 (p) 6C (l) 65 (e) 5B ([) 78 (x) 5D (]) 5B ([) 79 (y)
0x00000118: 5D (]) 29 ()) 3B (;) 0D     0A     20 ( ) 20 ( ) 20 ( )
0x00000120: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 7D (}) 0D     0A
0x00000128: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 7D (}) 0D     0A     0D
0x00000130: 0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 70 (p) 72 (r) 69 (i)
0x00000138: 6E (n) 74 (t) 66 (f) 28 (() 22 (") 5C (\) 6E (n) 22 (")
0x00000140: 29 ()) 3B (;) 0D     0A     0D     0A     20 ( ) 20 ( )
0x00000148: 20 ( ) 20 ( ) 2F (/) 2F (/) 20 ( ) 50 (P) 72 (r) 69 (i)
0x00000150: 6E (n) 74 (t) 20 ( ) 6F (o) 75 (u) 74 (t) 20 ( ) 74 (t)
0x00000158: 68 (h) 65 (e) 20 ( ) 61 (a) 72 (r) 72 (r) 61 (a) 79 (y)
0x00000160: 3A (:) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 66 (f)
0x00000168: 6F (o) 72 (r) 20 ( ) 28 (() 69 (i) 6E (n) 74 (t) 20 ( )
0x00000170: 78 (x) 20 ( ) 3D (=) 20 ( ) 30 (0) 3B (;) 20 ( ) 78 (x)
0x00000178: 20 ( ) 3C (<) 20 ( ) 33 (3) 3B (;) 20 ( ) 2B (+) 2B (+)
0x00000180: 78 (x) 29 ()) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( )
0x00000188: 7B ({) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( )
0x00000190: 20 ( ) 20 ( ) 20 ( ) 66 (f) 6F (o) 72 (r) 20 ( ) 28 (()
0x00000198: 69 (i) 6E (n) 74 (t) 20 ( ) 79 (y) 20 ( ) 3D (=) 20 ( )
0x000001A0: 30 (0) 3B (;) 20 ( ) 79 (y) 20 ( ) 3C (<) 20 ( ) 33 (3)
0x000001A8: 3B (;) 20 ( ) 2B (+) 2B (+) 79 (y) 29 ()) 0D     0A
0x000001B0: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( )
0x000001B8: 7B ({) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( )
0x000001C0: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 70 (p)
0x000001C8: 72 (r) 69 (i) 6E (n) 74 (t) 66 (f) 28 (() 22 (") 25 (%)
0x000001D0: 33 (3) 64 (d) 20 ( ) 22 (") 2C (,) 20 ( ) 65 (e) 78 (x)
0x000001D8: 61 (a) 6D (m) 70 (p) 6C (l) 65 (e) 5B ([) 78 (x) 5D (])
0x000001E0: 5B ([) 79 (y) 5D (]) 29 ()) 3B (;) 0D     0A     20 ( )
0x000001E8: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 20 ( ) 7D (})
0x000001F0: 0D     0A     0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( )
0x000001F8: 20 ( ) 20 ( ) 20 ( ) 20 ( ) 70 (p) 72 (r) 69 (i) 6E (n)
0x00000200: 74 (t) 66 (f) 28 (() 22 (") 5C (\) 6E (n) 22 (") 29 ())
0x00000208: 3B (;) 0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 7D (})
0x00000210: 0D     0A     0D     0A     20 ( ) 20 ( ) 20 ( ) 20 ( )
0x00000218: 70 (p) 72 (r) 69 (i) 6E (n) 74 (t) 66 (f) 28 (() 22 (")
```

```
0x00000220: 5C (\) 6E (n) 22 (") 29 ()) 3B (;) 0D     0A     0D
0x00000228: 0A     20 ( ) 20 ( ) 20 ( ) 20 ( ) 72 (r) 65 (e) 74 (t)
0x00000230: 75 (u) 72 (r) 6E (n) 20 ( ) 30 (0) 3B (;) 0D     0A
0x00000238: 7D (})
```

Ensure the program output is exactly as described, and that the whitespace of your source code is well formatted.