**Lab 2 – Malware Write Up**

The file that was altered was the “SAVED.GAM” file. It was obvious that this is where character and game information would be stored due to the name of the file. When opened with the hex editor “Frhed,” my character’s and party members’ names were displayed in the section to the right of the hex values. Using a hex to decimal (and vice versa) converter, I was able to assume the position of the character stats if it matched the in-game decimal value. After trial and error, the position of the character stats became obvious. In my game file, these values were after the character names between the hex values of “47” to “ff.” Each following characters’ stats were +20 hex to the previous position (i.e. Str for player character “Kevin” was at 0xE and “Shamino” is at 0x2E). The result(s) yielded maximum character stats and items in-game.

**The offsets (in hex) in “SAVED.GAM” file:**

Characters:

* ---Player---
  + Str: 0xE
  + Dex: 0xF
  + Int: 0x10
  + Magic: 0x11
  + HP: 0x12, 0x13
  + Max HP: 0x14, 0x15
  + Exp: 0x16, 0x17
* ---Shamino---
  + Str: 0x2E
  + Dex: 0x2F
  + Int: 0x30
  + Magic: 0x31
  + HP: 0x32, 0x33
  + Max HP: 0x34, 0x35
  + Exp: 0x36, 0x37
* ---Iolo---
  + Str: 0x4E
  + Dex: 0x4F
  + Int: 0x50
  + Magic: 0x51
  + HP: 0x52, 0x53
  + Max HP: 0x54, 0x55
  + Exp: 0x56, 0x57
* ---Mariah---
  + Str: 0x6E
  + Dex: 0x6F
  + Int: 0x70
  + Magic: 0x71
  + HP: 0x72, 0x73
  + Max HP: 0x74, 0x75
  + Exp: 0x76, 0x77
* ---Geoffrey---
  + Str: 0x8E
  + Dex: 0x8F
  + Int: 0x90
  + Magic: 0x91
  + HP: 0x92, 0x93
  + Max HP: 0x94, 0x95
  + Exp: 0x96, 0x98
* ---Jaana---
  + Str: 0xAE
  + Dex: 0xAF
  + Int: 0xB0
  + Magic: 0xB1
  + HP: 0xB2, 0xB3
  + Max HP: 0xB4, 0xB5
  + Exp: 0xB6, 0xB7
* ---Julia---
  + Str: 0xCE
  + Dex: 0xCF
  + Int: 0xD0
  + Magic: 0xD1
  + HP: 0xD2, 0xD3
  + Max HP: 0xD4, 0xD5
  + Exp: 0xD6, 0xD7
* ---Dupre---
  + Str: 0xEE
  + Dex: 0xEF
  + Int: 0xF0
  + Magic: 0xF1
  + HP: 0xF2, 0xF3
  + Max HP: 0xF4, 0xF5
  + Exp: 0xF6, 0xF7
* Etc…

Items:

* Gold: 0x204, 0x205
* Keys: 0x206
* Gems: 0x207
* Magic Carpets: 0x20A
* Skull Keys: 0x20B
* Black Badge: 0x218
* Magic Axes: 0x240

**The values were changed to (in hex) as listed:**

Character stats:

* Str: 63
* Dex: 63
* Int: 63
* Magic: 63
* HP: E7 03 (little endian)
* Max HP: E7 03 (little endian)
* Exp: 0F 27 (little endian)

Items:

* Gold: 0F 27 (little endian)
* Keys: 63
* Gems: 63
* Magic Carpets: 2
* Skull Keys: 63
* Black Badge: 1
* Magic Axes: A







