

1. Saved Game Fixup. I don't like keeping track of food and stuff like that when playing a game. So this utility keeps me flush for supplies! Since adjusting a saved game is risky business, we'll call the program through a wrapper that puts us in the proper directory and makes a backup first. This way, the source below just opens the file and makes changes directly without worrying.

```
#include <stdio.h>
int main(int argc, char **argv)
{
    FILE *saved_game;
    saved_game ← fopen("SAVED.GAM", "r+");
    ⟨ Adjust health 2 ⟩;
    ⟨ Max out the basic items 4 ⟩;
    ⟨ Max out skull keys 5 ⟩;
    ⟨ Max out spells and potions 6 ⟩;
    fclose(saved_game);
    return 0; /* we never fail! */
}
```

2. A character's maximum hp is at offset #12 in each character record. The records are #20 bytes each, starting at offset #02 in the file. So, to update everyone's health to the maximum, I simply go read their max, and then write their current hp to match.

```
#define NUM_RECORDS 16
#define CHAR_RECORD(x) #02 + (x) * #20
#define CUR_HP_OFFSET #10
#define MAX_HP_OFFSET #12
⟨ Adjust health 2 ⟩ ≡
for (int i ← 0; i < NUM_RECORDS; ++i) {
    fseek(saved_game, CHAR_RECORD(i) + MAX_HP_OFFSET, SEEK_SET);
    int lowbyte ← fgetc(saved_game);
    int highbyte ← fgetc(saved_game);
    fseek(saved_game, CHAR_RECORD(i) + CUR_HP_OFFSET, SEEK_SET);
    fputc(lowbyte, saved_game);
    fputc(highbyte, saved_game);
    ⟨ Make the character 'G'ood 3 ⟩;
}
```

This code is used in section 1.

3. *Ultima* tracks a disposition for each character in an ASCII letter. For example, 'G' for "Good," 'P' for "Poisoned," etc. We'll set each character to "Good."

```
#define DISPOSITION_OFFSET #0B
⟨ Make the character 'G'ood 3 ⟩ ≡
fseek(saved_game, CHAR_RECORD(i) + DISPOSITION_OFFSET, SEEK_SET);
fputc('G', saved_game);
```

This code is used in section 2.

4. The basic supplies of the game are food, gold, keys, gems, and torches. The first two max out at 9999 (#270F), while the others stop at 99 (#63).

```
#define write_99(cmt) fputc(#63, saved_game)
#define write_9999(cmt) fputc(#0f, saved_game); fputc(#27, saved_game)
#define BASIC_ITEM_OFFSET #202
⟨Max out the basic items 4⟩ ≡
fseek(saved_game, BASIC_ITEM_OFFSET, SEEK_SET);
write_9999(food);
write_9999(gold);
write_99(keys);
write_99(gems);
write_99(torches);
```

This code is used in section 1.

5. You can never have too many skull keys!

```
#define SKULL_KEY_OFFSET #20b
⟨Max out skull keys 5⟩ ≡
fseek(saved_game, SKULL_KEY_OFFSET, SEEK_SET);
write_99(skull_keys);
```

This code is used in section 1.

6. It will be nice to know we already have all the spells and potions available to us.

```
#define SPELL_OFFSET #24A
#define SPELL_COUNT 64
⟨Max out spells and potions 6⟩ ≡
fseek(saved_game, SPELL_OFFSET, SEEK_SET);
for (int i ← 0; i < SPELL_COUNT; ++i) {
    write_99(spells ∧ potions);
}
```

This code is used in section 1.

7. Shell Script Wrapper. Especially during development of this tool, I didn't want to accidentally obliterate my saved game. So, I call it from the following simple shell script, which makes a backup copy of the file before altering it.

```
<u5fix.sh> ≡  
#!/bin/bash  
cd /cygdrive/c/GOG Games/Ultima456/Ultima 5  
cp SAVED.GAM SAVED.BAK  
/usr/local/bin/u5sav
```

8. Index.

argc: [1](#).
argv: [1](#).
ASCII: [3](#).
BASIC_ITEM_OFFSET: [4](#).
CHAR_RECORD: [2](#), [3](#).
cmt: [4](#).
CUR_HP_OFFSET: [2](#).
DISPOSITION_OFFSET: [3](#).
fclose: [1](#).
fgetc: [2](#).
food: [4](#).
fopen: [1](#).
fputc: [2](#), [3](#), [4](#).
fseek: [2](#), [3](#), [4](#), [5](#), [6](#).
gems: [4](#).
gold: [4](#).
highbyte: [2](#).
i: [2](#), [6](#).
keys: [4](#).
lowbyte: [2](#).
main: [1](#).
MAX_HP_OFFSET: [2](#).
NUM_RECORDS: [2](#).
potions: [6](#).
saved_game: [1](#), [2](#), [3](#), [4](#), [5](#), [6](#).
SEEK_SET: [2](#), [3](#), [4](#), [5](#), [6](#).
SKULL_KEY_OFFSET: [5](#).
skull_keys: [5](#).
SPELL_COUNT: [6](#).
SPELL_OFFSET: [6](#).
spells: [6](#).
torches: [4](#).
write_99: [4](#), [5](#), [6](#).
write_9999: [4](#).

- ⟨ Adjust health 2 ⟩ Used in section 1.
- ⟨ Make the character ‘G’ood 3 ⟩ Used in section 2.
- ⟨ Max out skull keys 5 ⟩ Used in section 1.
- ⟨ Max out spells and potions 6 ⟩ Used in section 1.
- ⟨ Max out the basic items 4 ⟩ Used in section 1.

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	Section	Page
Saved Game Fixup	1	1
Shell Script Wrapper	7	3
Index	8	4