

Homework #7 (1)

- Write a ARM assembly program to perform three tasks
 - Read a text file named “**input.txt**”
 - Transfer lower case letters (‘a’ to ‘z’) to upper case letters
 - Other characters are not changed.
 - Output the results to the a text file named “**output.txt**”

Homework #7 (2)



A little bird was flying south for the winter. It was so cold the bird froze and fell to the ground in a large field. While it was lying there, a cow came by and dropped some dung on it. As the frozen bird lay there in the pile of cow dung, it began to realize how warm it was.

A LITTLE BIRD WAS FLYING SOUTH FOR THE WINTER. IT WAS SO COLD THE BIRD FROZE AND FELL TO THE GROUND IN A LARGE FIELD. WHILE IT WAS LYING THERE, A COW CAME BY AND DROPPED SOME DUNG ON IT. AS THE FROZEN BIRD LAY THERE IN THE PILE OF COW DUNG, IT BEGAN TO REALIZE HOW WARM IT WAS.

Homework #7 (3)

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用ARM assembly code撰寫

Homework #7 (4)

Function: **char trans(char)**

- Ex: trans('a') => 'A'
 - Ex: trans(':') => ':'
 - Ex: trans('B') => 'B'
 - 若傳入的字元是小寫英文字母，則傳回相對應的大寫字母；若是其他字元，則不改變直接傳回。
- 使用ARM assembly code實作

Homework #7 (5)

```
extern char trans(char);
```

Argument1 => Register r0

```
int main(void)
```

```
{
```

```
    /* Open/read the file "input.txt" */
```

```
    ...
```

```
    <char> = trans(<char>);
```

```
    ...
```

```
    /* Write the file "output.txt" */
```

```
    ...
```

```
}
```

遵守APCS規則

Homework #7 (6)

trans() function

```
.section .text  
.global trans  
.type trans,%function
```

trans:

```
mov    ip, sp  
stmfd  sp!, {fp, ip, lr, pc}  
sub    fp, ip, #4
```

< function body >

```
ldmea  fp, {fp, sp, pc}
```

請留意是否有callee-saved registers?

Homework #7 (7)

- Program should be assembled and linked by gcc (ARM-ELF format)
- Program should be executed under **GDB ARM simulator**
- 程式中應有適當的說明（註解）
- Two files: hw7.c trans.s
- 編譯方式:
\$ arm-elf-gcc -g -O0 hw7.c trans.s -o hw7.exe

Homework #7 (8)

- You should turn in to **ECOURSE**
 - README.txt (純文字檔)，描述你程式的內容、如何編譯程式、如何執行你的程式。
 - hw7.c
 - trans.s
 - Makefile
 - Any other files are required in your implementation
 - 你的測試檔: input.txt
 - 你程式執行之後產生的檔案: output.txt
- **Deadline: December 27 (Wednesday), 2017**