

toupper

Exercise 1

24219ff18510f65b915cbdbed33baf3d

November 30, 2015

toupper_simple

```
static void toupper_simple(char * text) {  
    char c;  
    while((c=*text) != 0){  
        *text++=c & 0xdf;  
    }  
}
```

toupper_128_npw

```
unsigned char c[] = {0xdf};
static void toupper_128_npw(char *text){
    asm(
        ".intel_syntax noprefix                \n"
        "    VPXOR xmm1,xmm1,xmm1              \n"
        "    VPBROADCASTB xmm2, [%1]            \n"
        "loop_128_npw:                          \n"
        "    VPAND xmm3, xmm2, [rdi]             \n"
        "    VPCMPISTRM xmm1, xmm3, 0x58        \n"
        "    VMASKMOVDQU xmm3, xmm0             \n"
        "    LEA rdi, [rdi+16]                  \n"
        "    JNZ loop_128_npw                   \n"
        ".att_syntax                             \n"
        : /* no output registers*/
        : "D"(text), "r"(c)
        : "xmm0", "xmm1", "xmm2", "xmm3");
}
```

toupper_128_pw_strm

```
unsigned char c[] = {0xdf};
static void toupper_128_pw_strm(char *text){
    asm(
        ".intel_syntax noprefix                \n"
        "    VPXOR xmm1,xmm1,xmm1              \n"
        "    VPBROADCASTB xmm2, [%1]            \n"
        "loop_128_pw_strm:                      \n"
        "    VPAND xmm3, xmm2, [rdi]             \n"
        "    VPCMPISTRM xmm1, xmm3, 0x58         \n"
        "    VMOVDQU [rdi], xmm3                 \n"
        "    LEA rdi, [rdi+16]                   \n"
        "    JNZ loop_128_pw_strm                \n"
        ".att_syntax                             \n"
        : /* no output registers*/
        : "D"(text), "r"(c)
        : "xmm0", "xmm1", "xmm2", "xmm3");
}
```

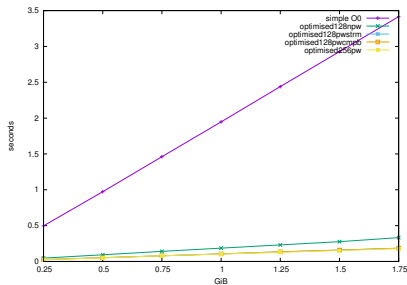
toupper_128_pw_cmpb

```
unsigned char c[] = {0xdf};
static void toupper_128_pw_cmpb(char *text){
    asm(
        ".intel_syntax noprefix           \n"
        "    VPXOR xmm1,xmm1,xmm1         \n"
        "    VPBROADCASTB xmm2, [%1]      \n"
        "loop_128_pw_cmpb:                \n"
        "    VPAND xmm3, xmm2, [rdi]       \n"
        "    VMOVDQU [rdi], xmm3           \n"
        "    VPCMPEQB xmm0, xmm3, xmm1     \n"
        "    VPTTEST xmm0, xmm0             \n"
        "    LEA rdi, [rdi+16]              \n"
        "    JZ loop_128_pw_cmpb           \n"
        ".att_syntax                       \n"
        : /* no output registers*/
        : "D"(text), "r"(c)
        : "xmm0", "xmm1", "xmm2", "xmm3");
}
```

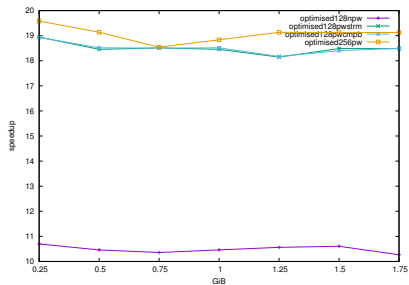
toupper_256_pw_cmpb

```
unsigned char c[] = {0xdf};
static void toupper_256_pw(char *text){
    asm(
        ".intel_syntax noprefix           \n"
        "    VPXOR ymm1,ymm1,ymm1         \n"
        "    VPBROADCASTB ymm2, [%1]      \n"
        "loop_256_pw:                     \n"
        "    VPAND ymm3, ymm2, [rdi]       \n"
        "    VMOVDQU [rdi], ymm3           \n"
        "    VPCMPEQB ymm0, ymm3, ymm1     \n"
        "    VPTTEST ymm0, ymm0             \n"
        "    LEA rdi, [rdi+32]              \n"
        "    JZ loop_256_pw                 \n"
        ".att_syntax                       \n"
        : /* no output registers*/
        : "D"(text), "r"(c)
        : "ymm0", "ymm1", "ymm2", "ymm3");
}
```

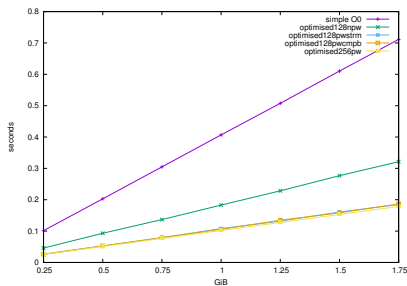
R1



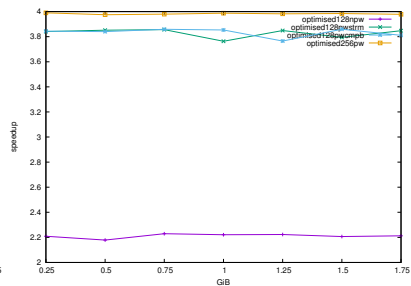
(a) Runtime



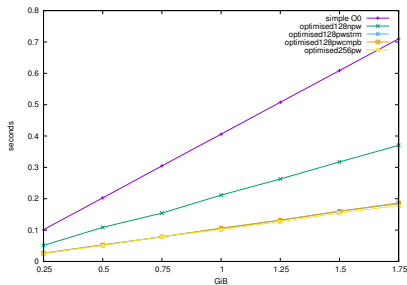
(b) Speedup



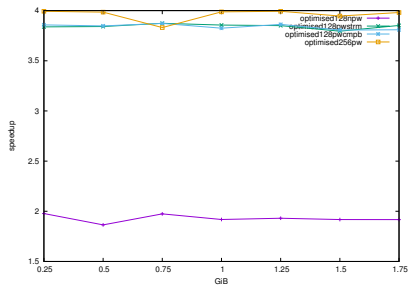
(a) Runtime



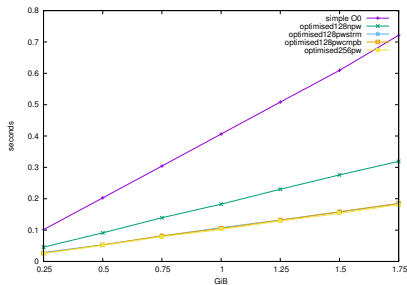
(b) Speedup



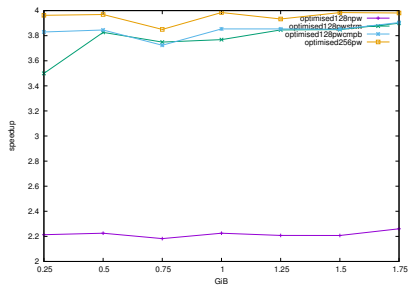
(a) Runtime



(b) Speedup



(a) Runtime



(b) Speedup