# CS 410000 Computer Architecture Homework 1

## (Due: 2017-09-29 23:59)

[102010002] [盧俊瑋]

Please evaluate your computer performance by executing the following benchmarks, and fill the blanks of table. In addition, the CPU spec of your computer has to be reported too. You can download the benchmark source code from iLms, and re-compile them for your Linux system.

**Compile Instructions**
1) Change directories to "src" of benchmarks. (eq. SPEC2000_SS/CINT2000/164.gzip/src)
2) Make sure your gcc location in *Makefile.defaults* (eq. cc=gcc), and type "make",
3) Execute the "./run" script, and report your program elapsed time.

| Reference machine spec (nthucad ic21) | |
|---|---|
| **Processor number** | Xeon(R) X5570 |
| **Frequency / # of core** | 2.93GHz/4C8Tx2 |
| **Memory** | 48G |
| **Operating system (OS)** | CentOS 5.11 |

| Benchmark | Execution time(sec) | Reference time (sec) | SPEC ratio |
|---|---|---|---|
| **164.gzip** | 0.537 | 1.102 | 2.052 |
| **256.bzip2** | 2.319 | 4.485 | 1.934 |
| **300.twolf** | 0.64 | 0.126 | 1.968 |
| **Geometric mean** | 1.984 | | |
| **Arithmetic mean** | 1.985 | | |

| Test machine spec | |
|---|---|
| **Processor number** | Intel(R) Xeon(R) CPU E3-1230 v6 |
| **Frequency / # of core** | 3.50GHz/4 |
| **Memory** | 8G |
| **Operating system (OS)** | ubuntu 16.04 LTS |

Snapshots of compilation results (including 164.gzip, 256.bzip2, and 300.twolf).
E.g.

```
[carolsung@ic18 src]$ make
gcc -c -o bits.o                 bits.c
gcc -c -o deflate.o                deflate.c
gcc -c -o gzip.o               gzip.c
gcc -c -o getopt.o              getopt.c
gcc -c -o inflate.o               inflate.c
gcc -c -o lzw.o              lzw.c
gcc -c -o spec.o               spec.c
gcc -c -o trees.o               trees.c
gcc -c -o unlzh.o              unlzh.c
gcc -c -o unlzw.o              unlzw.c
gcc -c -o unpack.o               unpack.c
gcc -c -o unzip.o              unzip.c
gcc -c -o util.o              util.c
gcc -c -o zip.o              zip.c
gcc         bits.o deflate.o gzip.o getopt.o inflate.o lzw.o spec.o trees.o unlz
h.o unlzw.o unpack.o unzip.o util.o zip.o     -o gzip
[carolsung@ic18 src]$
```

Snapshots of execution results (including 164.gzip, 256.bzip2, and 300.twolf)
E.g.

```
[vegetablebird@ic21 src]$ bash run
spec_init
Loading Input Data
Duplicating 1038922 bytes
Duplicating 19308 bytes
Input data 2097152 bytes in length
Compressing Input Data, level 1
Compressed data 2078079 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 3
Compressed data 2077889 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 5
Compressed data 2076940 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 7
Compressed data 2076922 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 9
Compressed data 2076922 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Tested 2MB buffer: OK!

real    0m1.102s
user    0m1.098s
sys     0m0.003s
```

```
kadai@Fiona:~/SPEC2000_SS/CINT2000/164.gzip/src$ bash run
spec_init
Loading Input Data
Duplicating 1038922 bytes
Duplicating 19308 bytes
Input data 2097152 bytes in length
Compressing Input Data, level 1
Compressed data 2078079 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 3
Compressed data 2077889 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 5
Compressed data 2076940 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 7
Compressed data 2076922 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 9
Compressed data 2076922 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Tested 2MB buffer: OK!

real    0m0.537s
user    0m0.536s
sys     0m0.000s
```

```
kadai@Fiona:~/SPEC2000_SS/CINT2000/256.bzip2/src$ bash run
spec_init
Loading Input Data
Input data 2097152 bytes in length
Compressing Input Data, level 7
Compressed data 2107853 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Compressing Input Data, level 9
Compressed data 2106855 bytes in length
Uncompressing Data
Uncompressed data 2097152 bytes in length
Uncompressed data compared correctly
Tested 2MB buffer: OK!

real    0m2.319s
user    0m2.316s
sys     0m0.000s
```

```
kadai@Fiona:~/SPEC2000_SS/CINT2000/300.twolf/src$ bash run

TimberWolfSC version:v4.3a date:Mon Jan 25 18:50:36 EST 1988
Standard Cell Placement and Global Routing Program
Authors: Carl Sechen, Bill Swartz
         Yale University
  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
 16  17  18  19  20  21  22  23  24  25  26  27  28  29  30
 31  32  33  34  35  36  37  38  39  40  41  42  43  44  45
 46  47  48  49  50  51  52  53  54  55  56  57  58  59  60
 61  62  63  64  65  66  67  68  69  70  71  72  73  74  75
 76  77  78  79  80  81  82  83  84  85  86  87  88  89  90
 91  92  93  94  95  96  97  98  99 100 101 102 103 104 105
106 107 108 109 110 111 112 113 114 115 116 117 118 119 120
122 123 124
real    0m0.064s
user    0m0.060s
sys     0m0.000s
```