

Preliminary work

EE 447: Lab #1

Programming with Subroutines, Parameter Passing, Utilization of Stacks & the concept of Recursion

Berkay İPEK

2304814 – Sec.2

Question 1)

D:\OKUL\ee 4ün 1i\Lab-447\Labtwo\QuestionOne\denxx.s

```
1
2          AREA      main, READONLY, CODE
3          THUMB
4          EXTERN    OutChar ; Reference external subroutine
5          EXTERN    OutStr
6          EXPORT    CONVRT ; Make available
7
8  CONVRT    PROC
9  start     PUSH      {R0,R1,R2,R3,R4,R5,R6,LR}
10          LDR        R0,=0x0 ;Temp value 1
11          LDR        R1,=0x0 ;Temp value 2
12          LDR        R2,=0x0 ;Temp value 3
13          LDR        R3,=0xA ;Since we are converting hex to decimal. It's based is 10 ( Hexa
[A]= Deci [10])
14          LDR        R5,=0x20000480 ;Address value that will be written ASCII Value
15          PUSH      {R5} ; Pushing address value
16          MOV        R6,R5
17          BL         CONVeRT ;Starter for subroutine
18          LDR        R1,=0x04 ;null char for outstr subroutine
19          STRB       R1,[R6]
20          POP        {R5} ; Popping address value
21          BL         checker
22  ret       BL         OutStr
23          POP        {R0,R1,R2,R3,R4,R5,R6,LR}
24          BX         LR
25          ENDP
26
27  checker   PROC
28          LDRB       R0,[R5]
29          CMP        R0,#0x30
30          BEQ        checker2
31          BX         LR
32
33  checker2  PROC
34          LDRB       R0,[R5,#1]
35          CMP        R0,#0x04
36          ADDNE      R5,#1
37          BX         LR
38
39  CONVeRT   PROC
40  loop      CMP        R4,#0
41          BEQ        finish
42          UDIV       R0,R4,R3 ; R0=(R4//0xA)
43          MUL        R1,R0,R3 ; R1=(R0*10) That will be our current digit, starting from unit digit
44          SUB        R2,R4,R1 ; R2= R4-R1 (that will be data for the current digit,starting from
unit digit)
45          STRB       R2,[R5] ; Writing Data
46          ADD        R5,R5,#1 ; Increasing Data Address
47          MOV        R4,R0 ; Updating number so that we can go to next digit
48          CMP        R4,#10 ; If it finishes, the number will be less than 10 otherwise it should
go to label "loop"
49          BMI        finish
50          B          loop
51  finish    STRB       R4,[R5]; Writing converted data is finished here. It is time to rearrange
numbers and converting ASCII values
52          MOV        R7,R5
53          ADD        R5,R5,#1
54          MOV        R8,R5
55  loop1     LDRB       R1,[R7] ; This loop is writing the same table at the end of it. However, it
is in reversed order
56          STRB       R1,[R5]
57          ADD        R5,R5,#1
58          SUB        R7,R7,#1
59          CMP        R7,R6
60          BPL        loop1
61  loop2     LDRB       R1,[R8] ; This loop is writing ASCII values in the reversed table at the
desired location
62          ADD        R1,R1,#48
63          STRB       R1,[R6]
64          ADD        R6,R6,#1
65          ADD        R8,R8,#1
66          CMP        R8,R5
67          BMI        loop2
68          MOV        R5,R6
69          BX         LR
70          ENDP
71          END
```

The screenshot shows a text editor window titled 'denax.s' containing assembly code. The code defines a main routine that initializes registers R0, R1, and R2, then enters a loop where it converts a hexadecimal value in R4 to decimal and prints it. A subroutine named CONVRT is also defined. Overlaid on the right is a terminal window titled 'Termite 3.4 (by CompuPhase)'. The terminal shows a command prompt 'COM3 9600 bps, 8N1, no handshake' and the output '2147483647'.

```
1
2      AREA      main, READONLY, CODE
3      THUMB
4      EXTERN    OutChar ; Reference external subroutine
5      EXTERN    OutStr
6      EXPORT    __main ; Make available
7
8      __main     PROC
9      start      LDR      R0,=0x0 ;Temp value 1
10             LDR      R1,=0x0 ;Temp value 2
11             LDR      R2,=0x0 ;Temp value 3
12             LDR      R3,=0xA ;Since we are converting hex to decimal. It's based is 10 (Hex)
13             LDR      R4,=0x7FFFFFFF ;Value that will be converted
14             LDR      R5,=0x20000480 ;Address value that will be written ASCII Value
15             PUSH     {R5} ; Pushing address value
16             MOV      R6,R5
17             BL       CONVRT ;Starter for subroutine
18             LDR      R1,=0x04 ;null char for outstr subroutine
19             STRB     R1,[R6]
20             POP      {R5} ; Popping address value
21             BL       OutStr
22             forever B      forever
23             ENDP
24
25      CONVRT     PROC
26      loop       CMP      R4,#0
27             BEQ      finish
28             UDIV     R0,R4,R3 ; R0=(R4//0xA)
29             MUL      R1,R0,R3 ; R1=(R0*10) That will be our current digit, starting from unit digit
30             SUB      R2,R4,R1 ; R2= R4-R1 (that will be data for the current digit,starting from unit digit)
31             STRB     R2,[R5] ; Writing Data
32             loop     BNE     loop
33             ENDP
34
35      finish     MOV      R0,R0
36             MOV      R1,R1
37             MOV      R2,R2
38             MOV      R3,R3
39             MOV      R4,R4
40             MOV      R5,R5
41             MOV      R6,R6
42             MOV      R7,R7
43             MOV      R8,R8
44             MOV      R9,R9
45             MOV      R10,R10
46             MOV      R11,R11
47             MOV      R12,R12
48             MOV      R13,R13
49             MOV      R14,R14
50             MOV      R15,R15
51             MOV      R16,R16
52             MOV      R17,R17
53             MOV      R18,R18
54             MOV      R19,R19
55             MOV      R20,R20
56             MOV      R21,R21
57             MOV      R22,R22
58             MOV      R23,R23
59             MOV      R24,R24
60             MOV      R25,R25
61             MOV      R26,R26
62             MOV      R27,R27
63             MOV      R28,R28
64             MOV      R29,R29
65             MOV      R30,R30
66             MOV      R31,R31
67             MOV      R32,R32
68             MOV      R33,R33
69             MOV      R34,R34
70             MOV      R35,R35
71             MOV      R36,R36
72             MOV      R37,R37
73             MOV      R38,R38
74             MOV      R39,R39
75             MOV      R40,R40
76             MOV      R41,R41
77             MOV      R42,R42
78             MOV      R43,R43
79             MOV      R44,R44
80             MOV      R45,R45
81             MOV      R46,R46
82             MOV      R47,R47
83             MOV      R48,R48
84             MOV      R49,R49
85             MOV      R50,R50
86             MOV      R51,R51
87             MOV      R52,R52
88             MOV      R53,R53
89             MOV      R54,R54
90             MOV      R55,R55
91             MOV      R56,R56
92             MOV      R57,R57
93             MOV      R58,R58
94             MOV      R59,R59
95             MOV      R60,R60
96             MOV      R61,R61
97             MOV      R62,R62
98             MOV      R63,R63
99             MOV      R64,R64
100            MOV      R65,R65
101            MOV      R66,R66
102            MOV      R67,R67
103            MOV      R68,R68
104            MOV      R69,R69
105            MOV      R70,R70
106            MOV      R71,R71
107            MOV      R72,R72
108            MOV      R73,R73
109            MOV      R74,R74
110            MOV      R75,R75
111            MOV      R76,R76
112            MOV      R77,R77
113            MOV      R78,R78
114            MOV      R79,R79
115            MOV      R80,R80
116            MOV      R81,R81
117            MOV      R82,R82
118            MOV      R83,R83
119            MOV      R84,R84
120            MOV      R85,R85
121            MOV      R86,R86
122            MOV      R87,R87
123            MOV      R88,R88
124            MOV      R89,R89
125            MOV      R90,R90
126            MOV      R91,R91
127            MOV      R92,R92
128            MOV      R93,R93
129            MOV      R94,R94
130            MOV      R95,R95
131            MOV      R96,R96
132            MOV      R97,R97
133            MOV      R98,R98
134            MOV      R99,R99
135            MOV      R100,R100
136            MOV      R101,R101
137            MOV      R102,R102
138            MOV      R103,R103
139            MOV      R104,R104
140            MOV      R105,R105
141            MOV      R106,R106
142            MOV      R107,R107
143            MOV      R108,R108
144            MOV      R109,R109
145            MOV      R110,R110
146            MOV      R111,R111
147            MOV      R112,R112
148            MOV      R113,R113
149            MOV      R114,R114
150            MOV      R115,R115
151            MOV      R116,R116
152            MOV      R117,R117
153            MOV      R118,R118
154            MOV      R119,R119
155            MOV      R120,R120
156            MOV      R121,R121
157            MOV      R122,R122
158            MOV      R123,R123
159            MOV      R124,R124
160            MOV      R125,R125
161            MOV      R126,R126
162            MOV      R127,R127
163            MOV      R128,R128
164            MOV      R129,R129
165            MOV      R130,R130
166            MOV      R131,R131
167            MOV      R132,R132
168            MOV      R133,R133
169            MOV      R134,R134
170            MOV      R135,R135
171            MOV      R136,R136
172            MOV      R137,R137
173            MOV      R138,R138
174            MOV      R139,R139
175            MOV      R140,R140
176            MOV      R141,R141
177            MOV      R142,R142
178            MOV      R143,R143
179            MOV      R144,R144
180            MOV      R145,R145
181            MOV      R146,R146
182            MOV      R147,R147
183            MOV      R148,R148
184            MOV      R149,R149
185            MOV      R150,R150
186            MOV      R151,R151
187            MOV      R152,R152
188            MOV      R153,R153
189            MOV      R154,R154
190            MOV      R155,R155
191            MOV      R156,R156
192            MOV      R157,R157
193            MOV      R158,R158
194            MOV      R159,R159
195            MOV      R160,R160
196            MOV      R161,R161
197            MOV      R162,R162
198            MOV      R163,R163
199            MOV      R164,R164
200            MOV      R165,R165
201            MOV      R166,R166
202            MOV      R167,R167
203            MOV      R168,R168
204            MOV      R169,R169
205            MOV      R170,R170
206            MOV      R171,R171
207            MOV      R172,R172
208            MOV      R173,R173
209            MOV      R174,R174
210            MOV      R175,R175
211            MOV      R176,R176
212            MOV      R177,R177
213            MOV      R178,R178
214            MOV      R179,R179
215            MOV      R180,R180
216            MOV      R181,R181
217            MOV      R182,R182
218            MOV      R183,R183
219            MOV      R184,R184
220            MOV      R185,R185
221            MOV      R186,R186
222            MOV      R187,R187
223            MOV      R188,R188
224            MOV      R189,R189
225            MOV      R190,R190
226            MOV      R191,R191
227            MOV      R192,R192
228            MOV      R193,R193
229            MOV      R194,R194
230            MOV      R195,R195
231            MOV      R196,R196
232            MOV      R197,R197
233            MOV      R198,R198
234            MOV      R199,R199
235            MOV      R200,R200
236            MOV      R201,R201
237            MOV      R202,R202
238            MOV      R203,R203
239            MOV      R204,R204
240            MOV      R205,R205
241            MOV      R206,R206
242            MOV      R207,R207
243            MOV      R208,R208
244            MOV      R209,R209
245            MOV      R210,R210
246            MOV      R211,R211
247            MOV      R212,R212
248            MOV      R213,R213
249            MOV      R214,R214
250            MOV      R215,R215
251            MOV      R216,R216
252            MOV      R217,R217
253            MOV      R218,R218
254            MOV      R219,R219
255            MOV      R220,R220
256            MOV      R221,R221
257            MOV      R222,R222
258            MOV      R223,R223
259            MOV      R224,R224
260            MOV      R225,R225
261            MOV      R226,R226
262            MOV      R227,R227
263            MOV      R228,R228
264            MOV      R229,R229
265            MOV      R230,R230
266            MOV      R231,R231
267            MOV      R232,R232
268            MOV      R233,R233
269            MOV      R234,R234
270            MOV      R235,R235
271            MOV      R236,R236
272            MOV      R237,R237
273            MOV      R238,R238
274            MOV      R239,R239
275            MOV      R240,R240
276            MOV      R241,R241
277            MOV      R242,R242
278            MOV      R243,R243
279            MOV      R244,R244
280            MOV      R245,R245
281            MOV      R246,R246
282            MOV      R247,R247
283            MOV      R248,R248
284            MOV      R249,R249
285            MOV      R250,R250
286            MOV      R251,R251
287            MOV      R252,R252
288            MOV      R253,R253
289            MOV      R254,R254
290            MOV      R255,R255
291            MOV      R256,R256
292            MOV      R257,R257
293            MOV      R258,R258
294            MOV      R259,R259
295            MOV      R260,R260
296            MOV      R261,R261
297            MOV      R262,R262
298            MOV      R263,R263
299            MOV      R264,R264
300            MOV      R265,R265
301            MOV      R266,R266
302            MOV      R267,R267
303            MOV      R268,R268
304            MOV      R269,R269
305            MOV      R270,R270
306            MOV      R271,R271
307            MOV      R272,R272
308            MOV      R273,R273
309            MOV      R274,R274
310            MOV      R275,R275
311            MOV      R276,R276
312            MOV      R277,R277
313            MOV      R278,R278
314            MOV      R279,R279
315            MOV      R280,R280
316            MOV      R281,R281
317            MOV      R282,R282
318            MOV      R283,R283
319            MOV      R284,R284
320            MOV      R285,R285
321            MOV      R286,R286
322            MOV      R287,R287
323            MOV      R288,R288
324            MOV      R289,R289
325            MOV      R290,R290
326            MOV      R291,R291
327            MOV      R292,R292
328            MOV      R293,R293
329            MOV      R294,R294
330            MOV      R295,R295
331            MOV      R296,R296
332            MOV      R297,R297
333            MOV      R298,R298
334            MOV      R299,R299
335            MOV      R300,R300
336            MOV      R301,R301
337            MOV      R302,R302
338            MOV      R303,R303
339            MOV      R304,R304
340            MOV      R305,R305
341            MOV      R306,R306
342            MOV      R307,R307
343            MOV      R308,R308
344            MOV      R309,R309
345            MOV      R310,R310
346            MOV      R311,R311
347            MOV      R312,R312
348            MOV      R313,R313
349            MOV      R314,R314
350            MOV      R315,R315
351            MOV      R316,R316
352            MOV      R317,R317
353            MOV      R318,R318
354            MOV      R319,R319
355            MOV      R320,R320
356            MOV      R321,R321
357            MOV      R322,R322
358            MOV      R323,R323
359            MOV      R324,R324
360            MOV      R325,R325
361            MOV      R326,R326
362            MOV      R327,R327
363            MOV      R328,R328
364            MOV      R329,R329
365            MOV      R330,R330
366            MOV      R331,R331
367            MOV      R332,R332
368            MOV      R333,R333
369            MOV      R334,R334
370            MOV      R335,R335
371            MOV      R336,R336
372            MOV      R337,R337
373            MOV      R338,R338
374            MOV      R339,R339
375            MOV      R340,R340
376            MOV      R341,R341
377            MOV      R342,R342
378            MOV      R343,R343
379            MOV      R344,R344
380            MOV      R345,R345
381            MOV      R346,R346
382            MOV      R347,R347
383            MOV      R348,R348
384            MOV      R349,R349
385            MOV      R350,R350
386            MOV      R351,R351
387            MOV      R352,R352
388            MOV      R353,R353
389            MOV      R354,R354
390            MOV      R355,R355
391            MOV      R356,R356
392            MOV      R357,R357
393            MOV      R358,R358
394            MOV      R359,R359
395            MOV      R360,R360
396            MOV      R361,R361
397            MOV      R362,R362
398            MOV      R363,R363
399            MOV      R364,R364
400            MOV      R365,R365
401            MOV      R366,R366
402            MOV      R367,R367
403            MOV      R368,R368
404            MOV      R369,R369
405            MOV      R370,R370
406            MOV      R371,R371
407            MOV      R372,R372
408            MOV      R373,R373
409            MOV      R374,R374
410            MOV      R375,R375
411            MOV      R376,R376
412            MOV      R377,R377
413            MOV      R378,R378
414            MOV      R379,R379
415            MOV      R380,R380
416            MOV      R381,R381
417            MOV      R382,R382
418            MOV      R383,R383
419            MOV      R384,R384
420            MOV      R385,R385
421            MOV      R386,R386
422            MOV      R387,R387
423            MOV      R388,R388
424            MOV      R389,R389
425            MOV      R390,R390
426            MOV      R391,R391
427            MOV      R392,R392
428            MOV      R393,R393
429            MOV      R394,R394
430            MOV      R395,R395
431            MOV      R396,R396
432            MOV      R397,R397
433            MOV      R398,R398
434            MOV      R399,R399
435            MOV      R400,R400
436            MOV      R401,R401
437            MOV      R402,R402
438            MOV      R403,R403
439            MOV      R404,R404
440            MOV      R405,R405
441            MOV      R406,R406
442            MOV      R407,R407
443            MOV      R408,R408
444            MOV      R409,R409
445            MOV      R410,R410
446            MOV      R411,R411
447            MOV      R412,R412
448            MOV      R413,R413
449            MOV      R414,R414
450            MOV      R415,R415
451            MOV      R416,R416
452            MOV      R417,R417
453            MOV      R418,R418
454            MOV      R419,R419
455            MOV      R420,R420
456            MOV      R421,R421
457            MOV      R422,R422
458            MOV      R423,R423
459            MOV      R424,R424
460            MOV      R425,R425
461            MOV      R426,R426
462            MOV      R427,R427
463            MOV      R428,R428
464            MOV      R429,R429
465            MOV      R430,R430
466            MOV      R431,R431
467            MOV      R432,R432
468            MOV      R433,R433
469            MOV      R434,R434
470            MOV      R435,R435
471            MOV      R436,R436
472            MOV      R437,R437
473            MOV      R438,R438
474            MOV      R439,R439
475            MOV      R440,R440
476            MOV      R441,R441
477            MOV      R442,R442
478            MOV      R443,R443
479            MOV      R444,R444
480            MOV      R445,R445
481            MOV      R446,R446
482            MOV      R447,R447
483            MOV      R448,R448
484            MOV      R449,R449
485            MOV      R450,R450
486            MOV      R451,R451
487            MOV      R452,R452
488            MOV      R453,R453
489            MOV      R454,R454
490            MOV      R455,R455
491            MOV      R456,R456
492            MOV      R457,R457
493            MOV      R458,R458
494            MOV      R459,R459
495            MOV      R460,R460
496            MOV      R461,R461
497            MOV      R462,R462
498            MOV      R463,R463
499            MOV      R464,R464
500            MOV      R465,R465
501            MOV      R466,R466
502            MOV      R467,R467
503            MOV      R468,R468
504            MOV      R469,R469
505            MOV      R470,R470
506            MOV      R471,R471
507            MOV      R472,R472
508            MOV      R473,R473
509            MOV      R474,R474
510            MOV      R475,R475
511            MOV      R476,R476
512            MOV      R477,R477
513            MOV      R478,R478
514            MOV      R479,R479
515            MOV      R480,R480
516            MOV      R481,R481
517            MOV      R482,R482
518            MOV      R483,R483
519            MOV      R484,R484
520            MOV      R485,R485
521            MOV      R486,R486
522            MOV      R487,R487
523            MOV      R488,R488
524            MOV      R489,R489
525            MOV      R490,R490
526            MOV      R491,R491
527            MOV      R492,R492
528            MOV      R493,R493
529            MOV      R494,R494
530            MOV      R495,R495
531            MOV      R496,R496
532            MOV      R497,R497
533            MOV      R498,R498
534            MOV      R499,R499
535            MOV      R500,R500
536            MOV      R501,R501
537            MOV      R502,R502
538            MOV      R503,R503
539            MOV      R504,R504
540            MOV      R505,R505
541            MOV      R506,R506
542            MOV      R507,R507
543            MOV      R508,R508
544            MOV      R509,R509
545            MOV      R510,R510
546            MOV      R511,R511
547            MOV      R512,R512
548            MOV      R513,R513
549            MOV      R514,R514
550            MOV      R515,R515
551            MOV      R516,R516
552            MOV      R517,R517
553            MOV      R518,R518
554            MOV      R519,R519
555            MOV      R520,R520
556            MOV      R521,R521
557            MOV      R522,R522
558            MOV      R523,R523
559            MOV      R524,R524
560            MOV      R525,R525
561            MOV      R526,R526
562            MOV      R527,R527
563            MOV      R528,R528
564            MOV      R529,R529
565            MOV      R530,R530
566            MOV      R531,R531
567            MOV      R532,R532
568            MOV      R533,R533
569            MOV      R534,R534
570            MOV      R535,R535
571            MOV      R536,R536
572            MOV      R537,R537
573            MOV      R538,R538
574            MOV      R539,R539
575            MOV      R540,R540
576            MOV      R541,R541
577            MOV      R542,R542
578            MOV      R543,R543
579            MOV      R544,R544
580            MOV      R545,R545
581            MOV      R546,R546
582            MOV      R547,R547
583            MOV      R548,R548
584            MOV      R549,R549
585            MOV      R550,R550
586            MOV      R551,R551
587            MOV      R552,R552
588            MOV      R553,R553
589            MOV      R554,R554
590            MOV      R555,R555
591            MOV      R556,R556
592            MOV      R557,R557
593            MOV      R558,R558
594            MOV      R559,R559
595            MOV      R560,R560
596            MOV      R561,R561
597            MOV      R562,R562
598            MOV      R563,R563
599            MOV      R564,R564
600            MOV      R565,R565
601            MOV      R566,R566
602            MOV      R567,R567
603            MOV      R568,R568
604            MOV      R569,R569
605            MOV      R570,R570
606            MOV      R571,R571
607            MOV      R572,R572
608            MOV      R573,R573
609            MOV      R574,R574
610            MOV      R575,R575
611            MOV      R576,R576
612            MOV      R577,R577
613            MOV      R578,R578
614            MOV      R579,R579
615            MOV      R580,R580
616            MOV      R581,R581
617            MOV      R582,R582
618            MOV      R583,R583
619            MOV      R584,R584
620            MOV      R585,R585
621            MOV      R586,R586
622            MOV      R587,R587
623            MOV      R588,R588
624            MOV      R589,R589
625            MOV      R590,R590
626            MOV      R591,R591
627            MOV      R592,R592
628            MOV      R593,R593
629            MOV      R594,R594
630            MOV      R595,R595
631            MOV      R596,R596
632            MOV      R597,R597
633            MOV      R598,R598
634            MOV      R599,R599
635            MOV      R600,R600
636            MOV      R601,R601
637            MOV      R602,R602
638            MOV      R603,R603
639            MOV      R604,R604
640            MOV      R605,R605
641            MOV      R606,R606
642            MOV      R607,R607
643            MOV      R608,R608
644            MOV      R609,R609
645            MOV      R610,R610
646            MOV      R611,R611
647            MOV      R612,R612
648            MOV      R613,R613
649            MOV      R614,R614
650            MOV      R615,R615
651            MOV      R616,R616
652            MOV      R617,R617
653            MOV      R618,R618
654            MOV      R619,R619
655            MOV      R620,R620
656            MOV      R621,R621
657            MOV      R622,R622
658            MOV      R623,R623
659            MOV      R624,R624
660            MOV      R625,R625
661            MOV      R626,R626
662            MOV      R627,R627
663            MOV      R628,R628
664            MOV      R629,R629
665            MOV      R630,R630
666            MOV      R631,R631
667            MOV      R632,R632
668            MOV      R633,R633
669            MOV      R634,R634
670            MOV      R635,R635
671            MOV      R636,R636
672            MOV      R637,R637
673            MOV      R638,R638
674            MOV      R639,R639
675            MOV      R640,R640
676            MOV      R641,R641
677            MOV      R642,R642
678            MOV      R643,R643
679            MOV      R644,R644
680            MOV      R645,R645
681            MOV      R646,R646
682            MOV      R647,R647
683            MOV      R648,R648
684            MOV      R649,R649
685            MOV      R650,R650
686            MOV      R651,R651
687            MOV      R652,R652
688            MOV      R653,R653
689            MOV      R654,R654
690            MOV      R655,R655
691            MOV      R656,R656
692            MOV      R657,R657
693            MOV      R658,R658
694            MOV      R659,R659
695            MOV      R660,R660
696            MOV      R661,R661
697            MOV      R662,R662
698            MOV      R663,R663
699            MOV      R664,R664
700            MOV      R665,R665
701            MOV      R666,R666
702            MOV      R667,R667
703            MOV      R668,R668
704            MOV      R669,R669
705            MOV      R670,R670
706            MOV      R671,R671
707            MOV      R672,R672
708            MOV      R673,R673
709            MOV      R674,R674
710            MOV      R675,R675
711            MOV      R676,R676
712            MOV      R677,R677
713            MOV      R678,R678
714            MOV      R679,R679
715            MOV      R680,R680
716            MOV      R681,R681
717            MOV      R682,R682
718            MOV      R683,R683
719            MOV      R684,R684
720            MOV      R685,R685
721            MOV      R686,R686
722            MOV      R687,R687
723            MOV      R688,R688
724            MOV      R689,R689
725            MOV      R690,R690
726            MOV      R691,R691
727            MOV      R692,R692
728            MOV      R693,R693
729            MOV      R694,R694
730            MOV      R695,R695
731            MOV      R696,R696
732            MOV      R697,R697
733            MOV      R698,R698
734            MOV      R699,R699
735            MOV      R700,R700
736            MOV      R701,R701
737            MOV      R702,R702
738            MOV      R703,R703
739            MOV      R704,R704
740            MOV      R705,R705
741            MOV      R706,R706
742            MOV      R707,R707
743            MOV      R708,R708
744            MOV      R709,R709
745            MOV      R710,R710
746            MOV      R711,R711
747            MOV      R712,R712
748            MOV      R713,R713
749            MOV      R714,R714
750            MOV      R715,R715
751            MOV      R716,R716
752            MOV      R717,R717
753            MOV      R718,R718
754            MOV      R719,R719
755            MOV      R720,R720
756            MOV      R721,R721
757            MOV      R722,R722
758            MOV      R723,R723
759            MOV      R724,R724
760            MOV      R725,R725
761            MOV      R726,R726
762            MOV      R727,R727
763            MOV      R728,R728
764            MOV      R729,R729
765            MOV      R730,R730
766            MOV      R731,R731
767            MOV      R732,R732
768            MOV      R733,R733
769            MOV      R734,R734
770            MOV      R735,R735
771            MOV      R736,R736
772            MOV      R737,R737
773            MOV      R738,R738
774            MOV      R739,R739
775            MOV      R740,R740
776            MOV      R741,R741
777            MOV      R742,R742
778            MOV      R743,R743
779            MOV      R744,R744
780            MOV      R745,R745
781            MOV      R746,R746
782            MOV      R747,R747
783            MOV      R748,R748
784            MOV      R749,R749
785            MOV      R750,R750
786            MOV      R751,R751
787            MOV      R752,R752
788            MOV      R753,R753
789            MOV      R754,R754
790            MOV      R755,R755
791            MOV      R756,R756
792            MOV      R757,R757
793            MOV      R758,R758
794            MOV      R759,R759
795            MOV      R760,R760
796            MOV      R761,R761
797            MOV      R762,R762
798            MOV      R763,R763
799            MOV      R764,R764
800            MOV      R765,R765
801            MOV      R766,R766
802            MOV      R767,R767
803            MOV      R768,R768
804            MOV      R769,R769
805            MOV      R770,R770
806            MOV      R771,R771
807            MOV      R772,R772
808            MOV      R773,R773
809            MOV      R774,R774
810            MOV      R775,R775
811            MOV      R776,R776
812            MOV      R777,R777
813            MOV      R778,R778
814            MOV      R779,R779
815            MOV      R780,R780
816            MOV      R781,R781
817            MOV      R782,R782
818            MOV      R783,R783
819            MOV      R784,R784
820            MOV      R785,R785
821            MOV      R786,R786
822            MOV      R787,R787
823            MOV      R788,R788
824            MOV      R789,R789
825            MOV      R790,R790
826            MOV      R791,R791
827            MOV      R792,R792
828            MOV      R793,R793
829            MOV      R794,R794
830            MOV      R795,R795
831            MOV      R796,R796
832            MOV      R797,R797
833            MOV      R798,R798
834            MOV      R799,R799
835            MOV      R800,R800

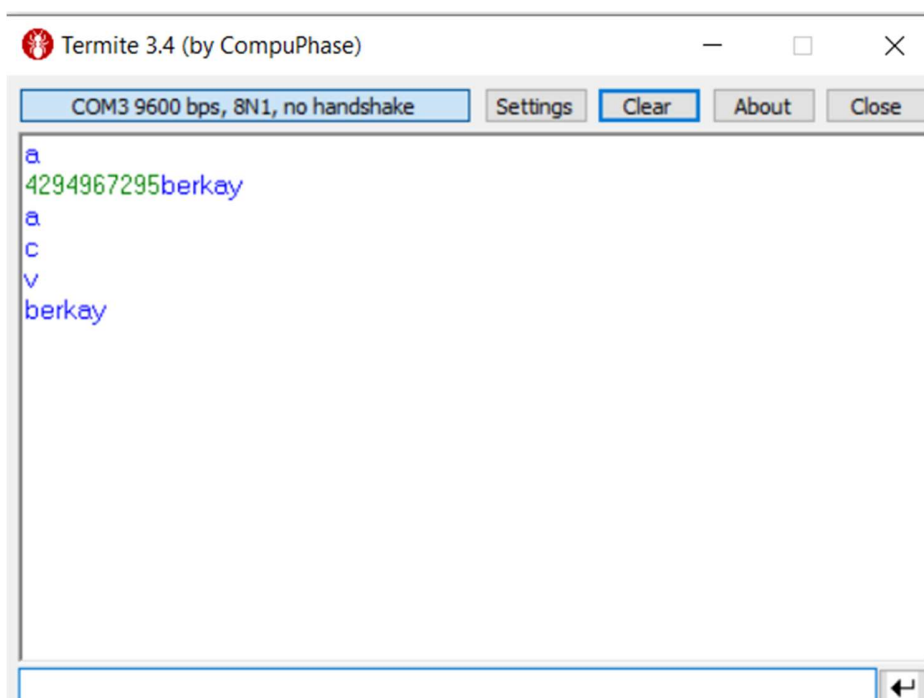
```

Question 2)

D:\OKUL\ee 4ün 1i\Lab-447\Labtwo\QuestionTwo\programming_directive.s

```
1
2          AREA      main, READONLY, CODE
3          THUMB
4          EXTERN    CONVRT
5          EXTERN    InChar
6          EXPORT    __main
7
8
9  NUM      EQU      0x20000480
10
11 __main    PROC
12 geta      BL        InChar ;Getting Character
13          CMP        R5,#0x00 ; Checking if its ASCII value is zero or nor
14          BEQ        geta ; if it is zero then wait for another input
15          LDR        R0,=NUM ; Stote the adress, NUM, in the register R0
16          LDR        R4,[R0] ; Load R4 by the value pointed by NUM so that it can pass it to
17 subroutine CONVRT
18          BL        CONVRT ; Go to CONVRT subroutine
19 done      B         done ; Infinitive loop
20          ALIGN
21          ENDP
```

Figure 2: Debugging session for Program_Directives.s file



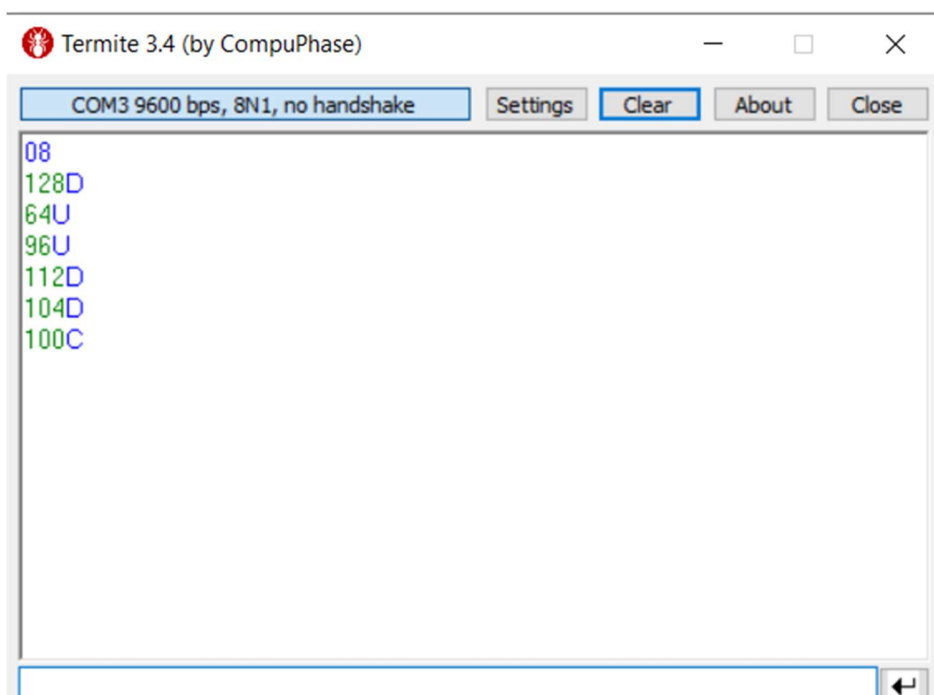
Question 3)

D:\OKUL\ee 4ün 1i\Lab-447\Labtwo\QuestionThree\programming_directive.s

```
1
2          AREA          main, READONLY, CODE
3          THUMB
4          EXTERN        CONVRT
5          EXTERN        InChar
6          EXTERN        UPBND
7          EXPORT        __main
8
9
10
11 __main    PROC;TAKING DATA AS WITH TWO DIGITS
12          LDR           R8,=0xA
13          BL            InChar
14          PUSH          {R5}
15          BL            InChar
16          POP           {R7}
17          SUB           R7,#0x30
18          SUB           R5,#0x30
19          MUL           R7,R8
20          ADD           R5,R7
21          MOV           R2,R5; R2=n
22          ;Preparation for the algorithm
23          MOV           R0,#0;This will be held for minimum limit
24          MOV           R11,#1; R11=1
25          LSL           R11,R11,R2;This will be the maximum == 2^n
26          ADD           R1,R11,R0 ; R1=R11+R0 (MIN+MAX)
27          LSR           R1,R1,#1 ; R1=R1/2 (MIN+MAX)/2
28          MOV           R4,R1
29          BL            CONVRT
30          BL            UPBND
31          B             calcu
32          loop          B             loop
33          ALIGN
34          ENDP
```

D:\OKUL\ee 4ün 1i\Lab-447\Labtwo\QuestionThree\updater.s

```
1
2          AREA          main, READONLY, CODE
3          THUMB
4          EXTERN        InChar ; Reference external subroutine
5          EXPORT        UPBND ; Make available
6
7          UPBND         PROC
8          start        PUSH          {R2,R3,R4,R5,R6,LR}
9          geta          BL            InChar
10         CMP           R5,#0x43 ; if input == 'C'
11         BEQ           forever ; Finalize and go to infinite loop
12         CMP           R5,#0x55 ; if input == 'U'
13         BEQ           chLW ; Change lower bound
14         CMP           R5,#0x44 ; if input == 'D'
15         BEQ           chHG ; Change upper bound
16         B             geta
17         forever       B             forever
18         ENDP
19
20         chLW          PROC
21         MOV           R0,R1
22         POP           {R2,R3,R4,R5,R6,LR}
23         BX            LR
24
25         chHG          PROC
26         MOV           R11,R1
27         POP           {R2,R3,R4,R5,R6,LR}
28         BX            LR
29         ENDP
30
31
32         END
```



Question 4)

D:\OKUL\ee 4ün 1i\Lab-447\Labtwo\QuestionFour\programming_directive.s

```
1
2         AREA      main, READONLY, CODE
3         THUMB
4         EXTERN    CONVRT
5         EXTERN    InChar
6         EXPORT    __main
7
8
9  MULT    EQU      0x00000002
10
11  __main  PROC
12          LDR      R8,=0xA
13          BL       InChar ;Taken From Manual
14          PUSH     {R5}
15          BL       InChar
16          POP      {R7}
17          SUB      R7,#0x30
18          SUB      R5,#0x30
19          MUL      R7,R8
20          ADD      R5,R7
21          MOV      R1,R5
22          LDR      R0,=0x20000800
23          LDR      R6,=MULT ;
24          LDR      R5,=0x20000100
25          CMP      R1,#0x02
26          BMI     special
27          PUSH     {R5}
28          BL       fibo
29          POP      {R1}
30  loop    LDR      R0,[R1]
31          MOV      R4,R0
32          ADD      R1,#0x04
33          BL       CONVRT
34          CMP      R1,R5
35          BNE     loop
36  forever B       forever
37          ENDP
38
39  special PROC
40          MOV      R4,#0x0
41          BL       CONVRT
42          SUBS     R1,#0x1
43          BMI     forever
44          MOV      R4,#0x1
45          BL       CONVRT
46          B       forever
47
48  wrt     STR      R1,[R5]
49          ADD      R5,#4
50          STR      R2,[R5]
51          ADD      R5,#4
52          B       exit
53
54  wrt2    STR      R2,[R5]
55          ADD      R5,#4
56          B       cont
57
58
59
60  fibo    CMP      R1,#2
61          MOVEQ    R1,#0
62          MOVEQ    R2,#1
63          BEQ     wrt
64          STMDB    SP!,{LR}
65          SUB      R1,R1,#1
66          BL       fibo
67          LDMIA    SP!,{LR}
68  exit    PUSH     {R2}
69          MUL      R3,R2,R6
70          ADD      R2,R1,R3
71          B       wrt2
72  cont    POP      {R1}
73          MOV      PC,LR
74          ALIGN
75          ENDP
```

