INTRODUCTION TO DIGITAL SYSTEMS

SYSC2310 (Fall 2020)

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Lab 3: Answer Sheet

Exercise 1: Design an Arbitrary Function.

$P = \overline{A2}\,A1\,A0 + \overline{A3}\,\overline{A2}\,A1 + \overline{A3}\,A2\,A0 + A2\,\overline{A1}\,A0$

$D = \overline{A3}\,A2\,A0 + A3\,\overline{A2}\,\overline{A1} + A3\,\overline{A1}\,\overline{A0} + \overline{A3}\,\overline{A2}\,A1\,A0 + A3\,A2\,A1\,A0$

The total number of AND and OR gates is:

3-pin AND: 7 4-pin AND: 2 4-pin OR: 1 5-pin OR: 1

Exercise 2: BCD to 7-Segment Decoder (IC 7447)

$S_a = \overline{D2}\,\overline{D0} + D3 + D1 + D2\,D0$

$S_b = \overline{D2} + \overline{D1}\,\overline{D0} + D1\,D0$

$S_c = \overline{D1} + D0 + D2$

$S_d = \overline{D2}\,D0 + \overline{D2}\,D1 + D1\,\overline{D0} + D3 + D2\,\overline{D1}\,D0$

$S_e = \overline{D0}\,(\overline{D2} + D1)$

$S_f = \overline{D1}\,\overline{D0} + D2\,\overline{D0} + D2\,\overline{D1} + D3$

$S_g = D2\,\overline{D1} + D3 + \overline{D2}\,D1 + D1\,\overline{D0}$

The total number of AND and OR gates is:

2-pin AND: 14 3-pin AND: 1 4-pin OR: 3 3-pin OR: 2 5-pin OR: 1 2-pin OR: 1