Digital Design Principles
Assignment 1
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Question 1:
a) 1010 + 1100

  Half Adder

     1010
     1100

     — — —

  S = 0110
  C = 1000

  Full Adder

     1010
     1100

     — — —

  S = 0110
  C_{out} = 1

b) 1101 + 1011

Half Adder

     1101
     1011

     — — —

  S = 0110
  C = 1001

  Full Adder

     1101
     1011

     — — —

  S = 1000
  C_{out} = 1

c) 1111 + 1010

Half Adder
$$1111$$
$$1010$$
$$\overline{}$$
$$S\ =0101$$
$$C\ =1010$$
Full Adder
$$1111$$
$$1010$$
$$\overline{}$$
$$S=\ 1001$$
$$C_{out}=1$$

d) 0101 + 1101

Half Adder
$$0101$$
$$1101$$
$$\overline{}$$
$$S\ =1000$$
$$C\ =0101$$
Full Adder
$$0101$$
$$1101$$
$$\overline{}$$
$$S=\ 0010$$
$$C_{out}=1$$

e) 1101 + 0110

Half Adder
$$1101$$
$$0110$$
$$\overline{}$$
$$S\ =1011$$
$$C\ =0100$$
Full Adder
$$1101$$
$$0110$$
$$\overline{}$$

S = 0011
$C_{out} = 1$

Question 2:

a) 1100 + 1011
   Full Adder $C_i = 1$

      1100
      1011
      — — —
   S = 1000
   $C_{out} = 1$

b) 1010 + 1101
Full Adder $C_i = 1$

      1010
      1101
      — — —
   S = 1000
   $C_{out} = 1$

c) 0111 + 1111
Full Adder $C_i = 1$

      0111
      1111
      — — —
   S = 0111
   $C_{out} = 1$