ECE374 SP23 HW1

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Problem 4

4: (a). $1^*01^*01^*$.
  Explanation: There may be at most 2 zero's.
  (b). $(0+10)^*(\varepsilon+1)(1+01)^*(\varepsilon+0)$.
  Explanation: The former half excludes 11 while
     the latter half excludes 00.
  (c). $0^*+1^*+0^*1^*+1^*0^*+1^*0^*1^*$. Equivalently, $1^*0^*1^*$.
  Explanation: Think in sections. A section of 1's followed by
     0's and 1's. Each section may be empty.
     Expanding the head ($0^*1^*0^*1^*$) or tail ($1^*0^*1^*0^*$)
     will both introduce the 010 substring!
  (d). $1^*0^*1^*0^*1^*0^*1^*$.
  Explanation: A generalized case of (c).
  (e). 0^*1^*.
  Explanation: Also a generalized case of (c). the
     All zero's should appear before ones.