2. let as assume $A = \{a^{2n})b^n|n \geq 0\}$ is regular.

   let pumping length = p $A = \{a^{2p})b^p$ divide this into $xy'z$

   lets say p=2 $S = a^{2*2}b^2$ which is aaaabb where $x = ay = aaaandz = bb$

   case 1 'y' is in a part $(a + aaa + bb)$

   so xy^iz is xy^2z for $i - 2$

   therefore we have a aaa aaa bb which is a^7b^2 does not comes in $a^{2n}b^n$

   case 2: y lies in b part so aaaabb where $x = aaaay = bz = b$

   for $i - 2$ xy^2z equals aaaa bbb (a^4b^3) does not comes with $a^{2n}b^n$

   case 3: y lies in a and b part so we have aaaabb where $x = aaay = abz = b$

   for $i - 2$ xy^2z equals aaa abab b which does not comes under $a^{2n}b^n$

   hence our assumption was wrong. so according to pumping lemma we can say that $\{a^{2n})b^n|n \geq 0\}$ is not regular

1. Consider set X = {n—n $a \notin f(n)$}

   we can say that x is not a value of f. lets suppose that $X = f(k)$. does k belong to f(k)?

   if yes then no. for if$k \in f(k)$ then $k \notin$X but X is f(k)

   if no then yes. if $k \notin f(k)$ then$k \in x$ and P(X)

   so there is no such f between X and p(x)