# 640.https://stackoverflow.com/questions/68899430/erc721-how-do-i-generate-nfts-from-different-characteristics-e-g-punks-apes

**T:**ERC721 - how do I generate nfts from different characteristics (e.g punks, apes...)?

**Q:**ERC721 - how do I generate nfts from different characteristics? Like punks, apes, bored bananas, wicked craniums...  
  
Do these projects only generate all of the 1000s of images at first mint? Or are they already created and stored somewhere?  
  
Do they actually create the image or is it stored as separate elements that only puts it all together when someone calls a function to see that image  
  
I believe these projects are created using erc721 contracts

2 **Answer**

**A1:**The code for the NFTs are available here, so it’s possible to examine and figure out how it works: https://etherscan.io/address/0x60e4d786628fea6478f785a6d7e704777c86a7c6#code  
  
I am not an expert, but what it appears to do is use a series of lookup tables to map an Ape ID to a particular hash value that contains the attributes of the Ape and an image of it. Mutant apes are just additional lookup table entries based on ape ID and offset based on the serum count applied (or a separate offset of mutant serum was applied).  
  
So all the generation happens off chain and then the contract is just is a pointer to the appropriate entry.

**C1:**Please provide additional details in your answer. As it's currently written, it's hard to understand your solution.

**A2:**Some are generated on the first mint, others are generated before hand (locally), then listed on the NFT platforms.  
  
The ones generated on first mint could be all (1000x etc) of them or in some cases they use solidity and a custom interface linked to the contract which will generate (1x) when purchased.  
  
In most cases and with the majority of popular NFTs, I'd assume they are generated before they are minted/listed, giving more control with the separate meta data etc for each file. Although, both examples ^ in terms of generation are the same, 1 just uses an API/script to mint directly to a platform such as OpenSea upon generation and the other is ran locally then minted separately and of course depending on your experience and needs a combination of both is also possible.  
  
This I personally would say is slightly risky, depending on your goal and experience with NFTs, as if the contract code generates attributes, meta data, variations etc at the same time it's minted, you may not have the ability to check if your generated variations rendered how you wanted and you would still be paying fees to generate them.  
  
Again, this is solely preference and depends on your experience with NFT contracts, platforms and generative art and I know there are many other ways of doing this. Above is a simple breakdown of common routes people take.  
  
\*Update:Here is an example of one that generates/mints an NFT upon purchase, known as Blind Minting:https://tiedyeninjas.com/  
  
You could also review another NFTs contract code to replicate the mint functions.  
  
For NFTs created locally before they are minted, have a look at this script for creating generative NFT art.https://github.com/NotLuksus/nft-art-generator^The creator also has a YouTube video explaining the usage.https://www.youtube.com/watch?v=ThLoQTh0QUQ