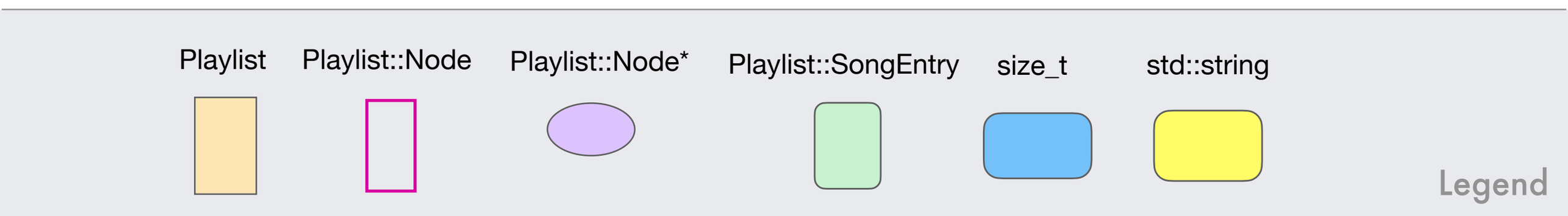
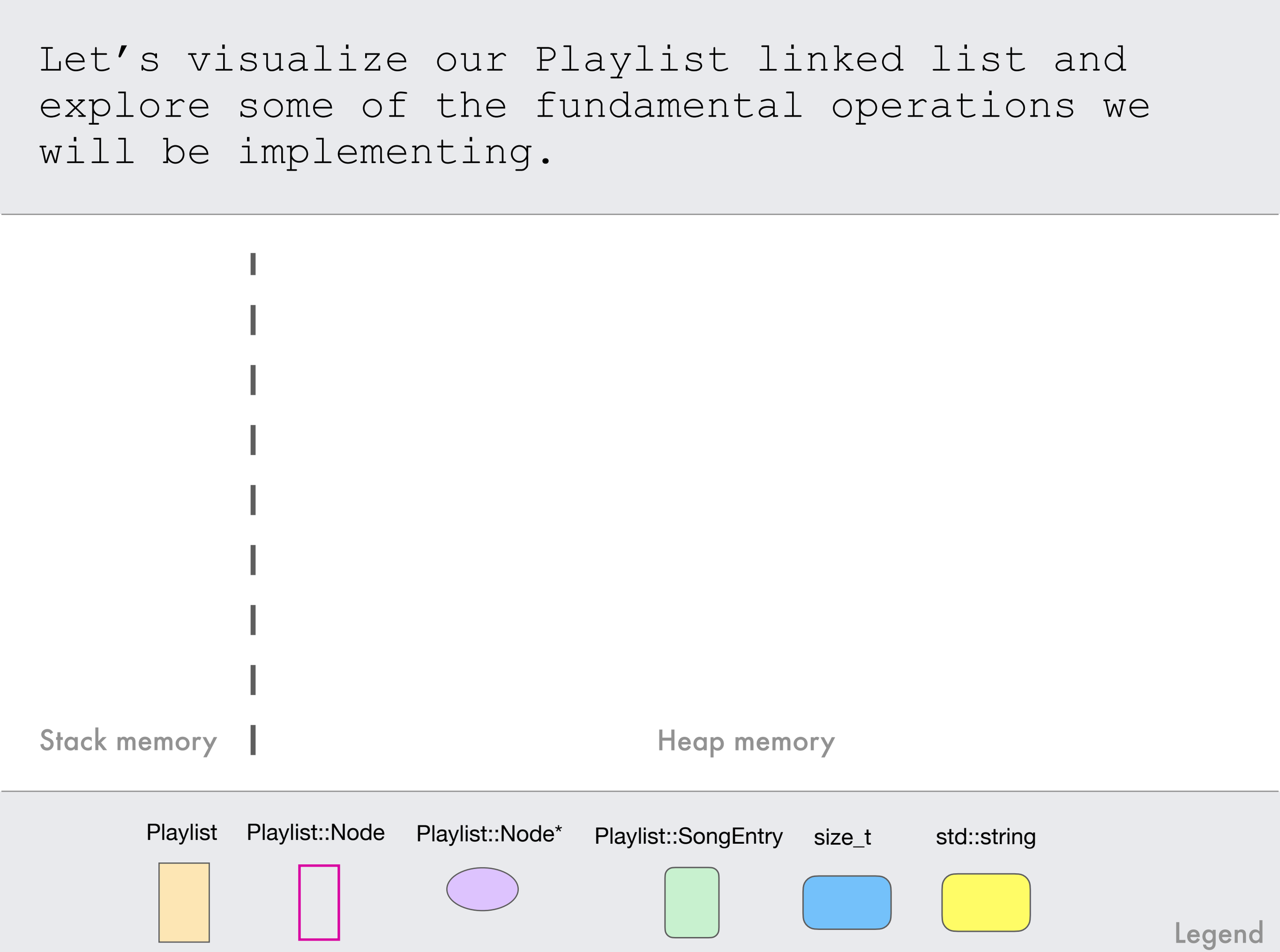
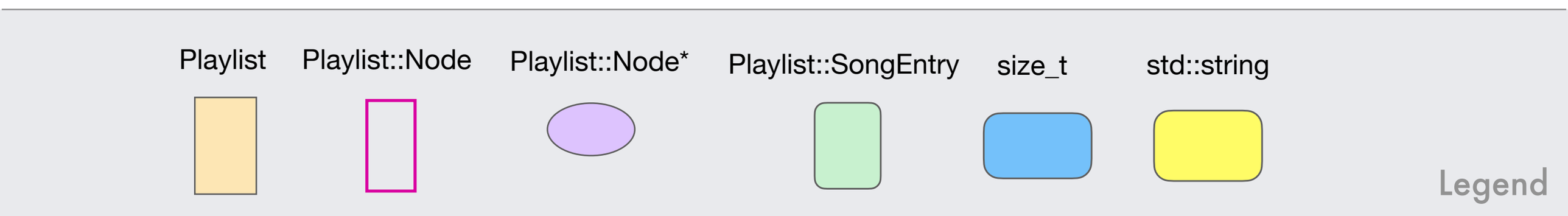
CS2B Project 02: Playlist
* Click to advance, or use arrow keys
* Hover far left for thumbnail sidebar



Let’s visualize our Playlist linked list and explore some of the fundamental operations we will be implementing.



We'll consider a local playlist object created by the user that lives in stack memory.



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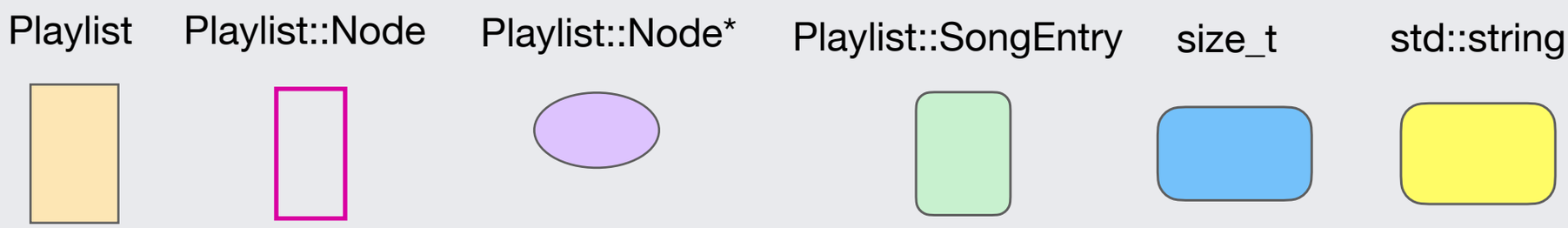
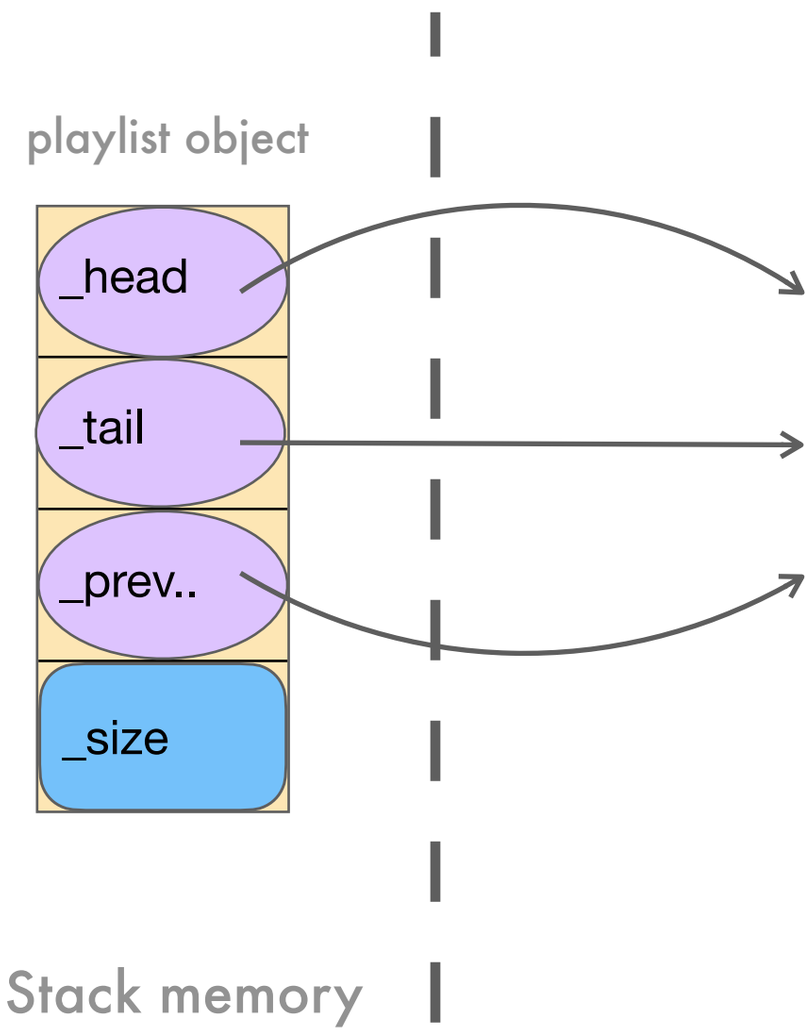
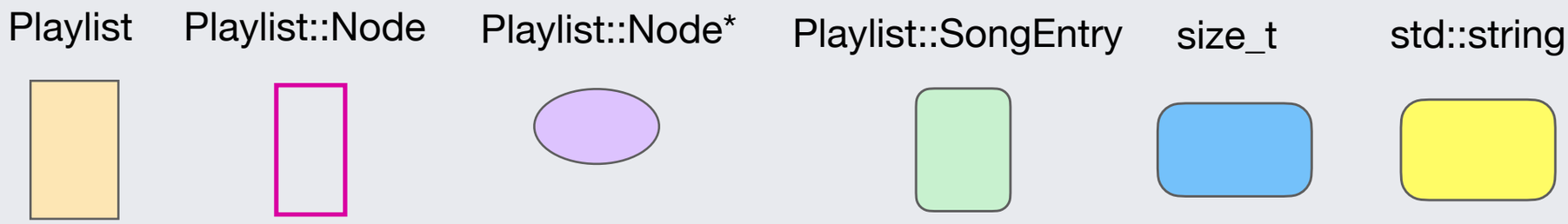
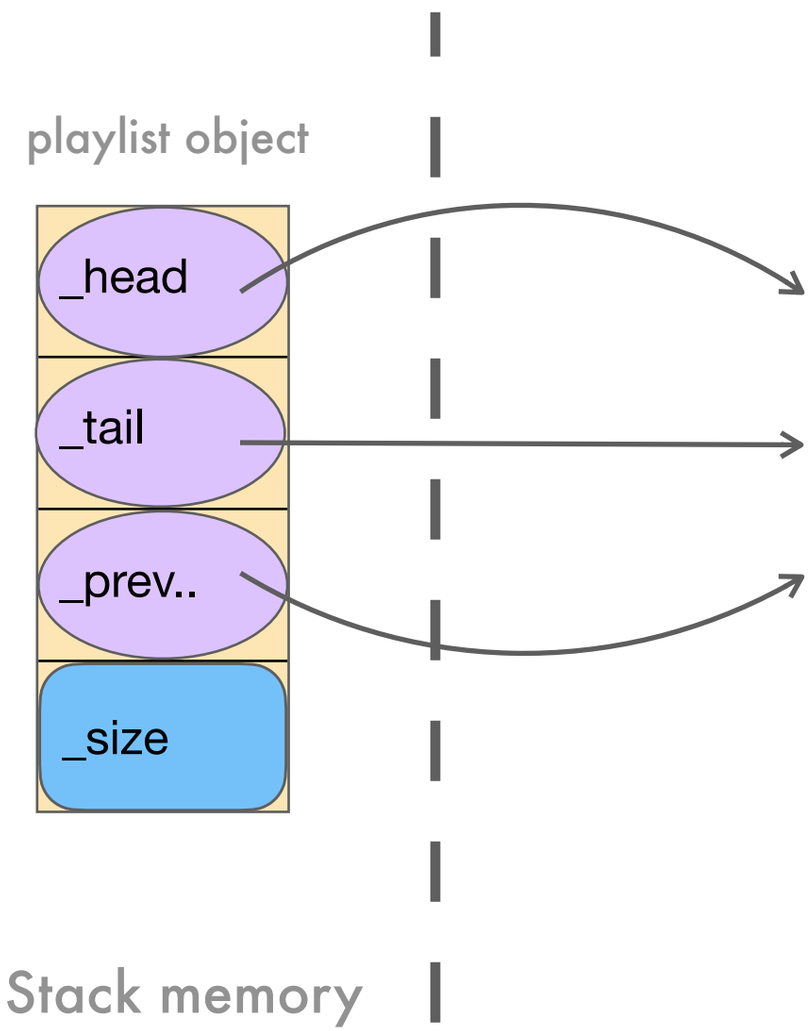


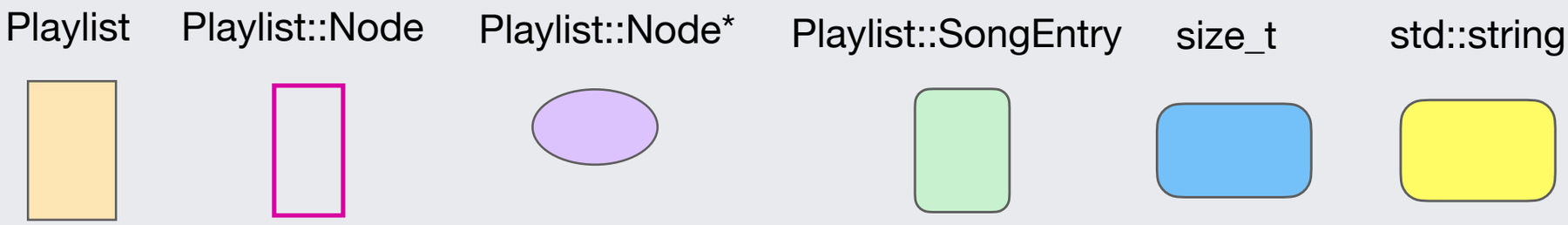
It will have node pointer (Playlist::Node*) data members that point into heap memory. The Playlist class will dynamically allocate (and deallocate) memory for Nodes in heap memory.





These Node*'s should be initialized to point to the one and same head sentinel node with sentinel SongEntry member values of -1 and "HEAD".





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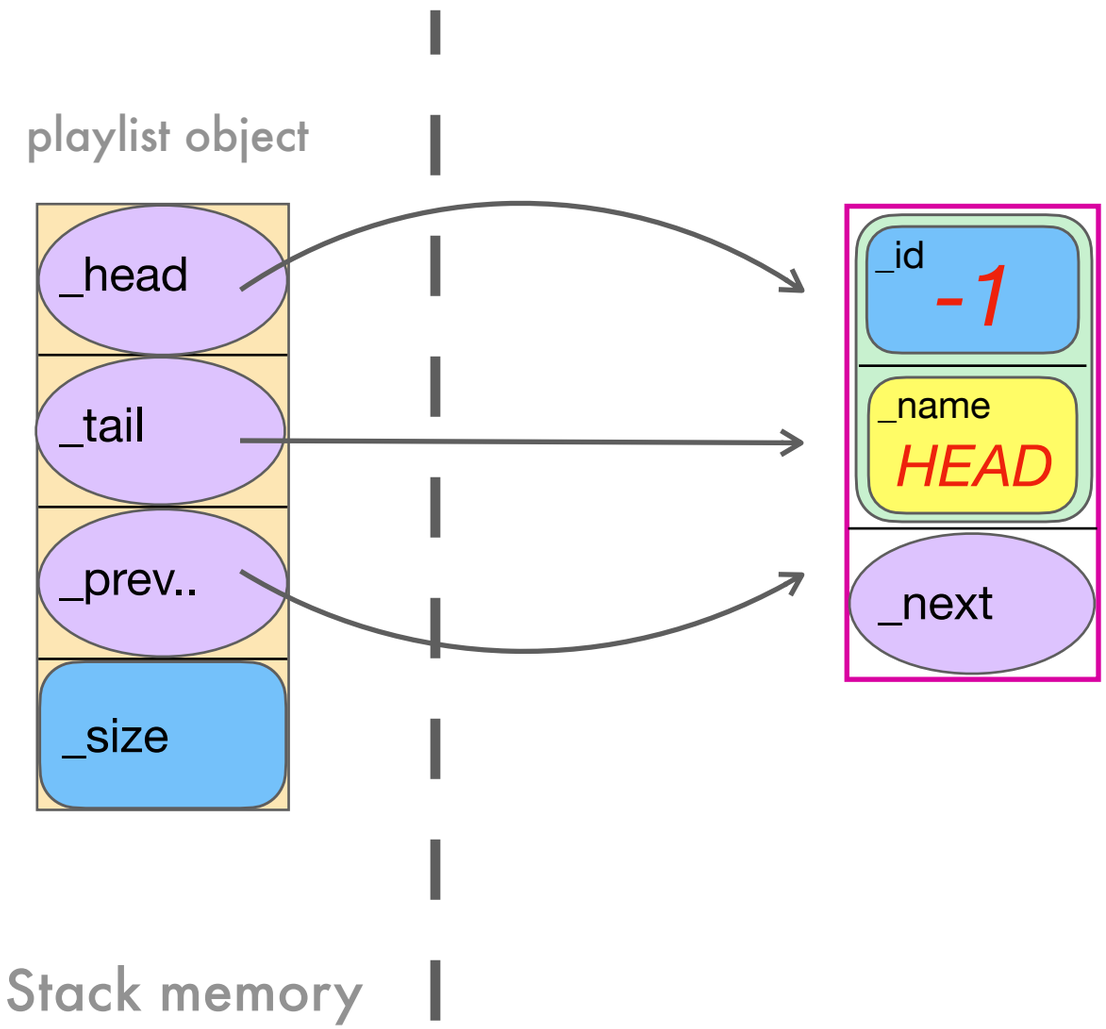
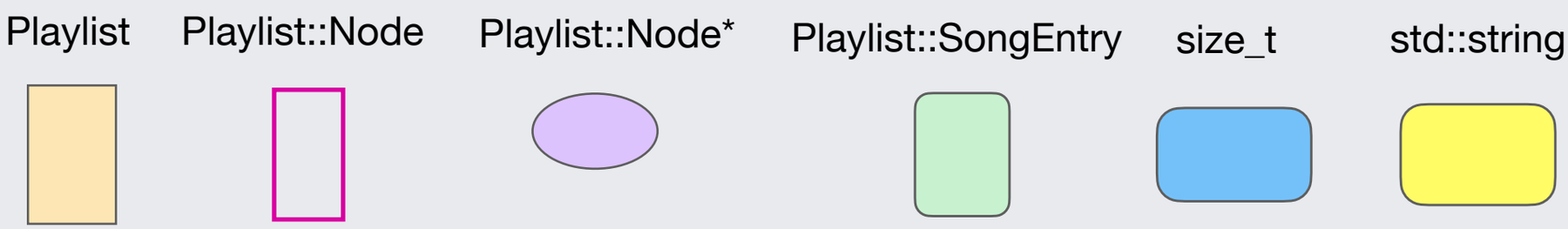
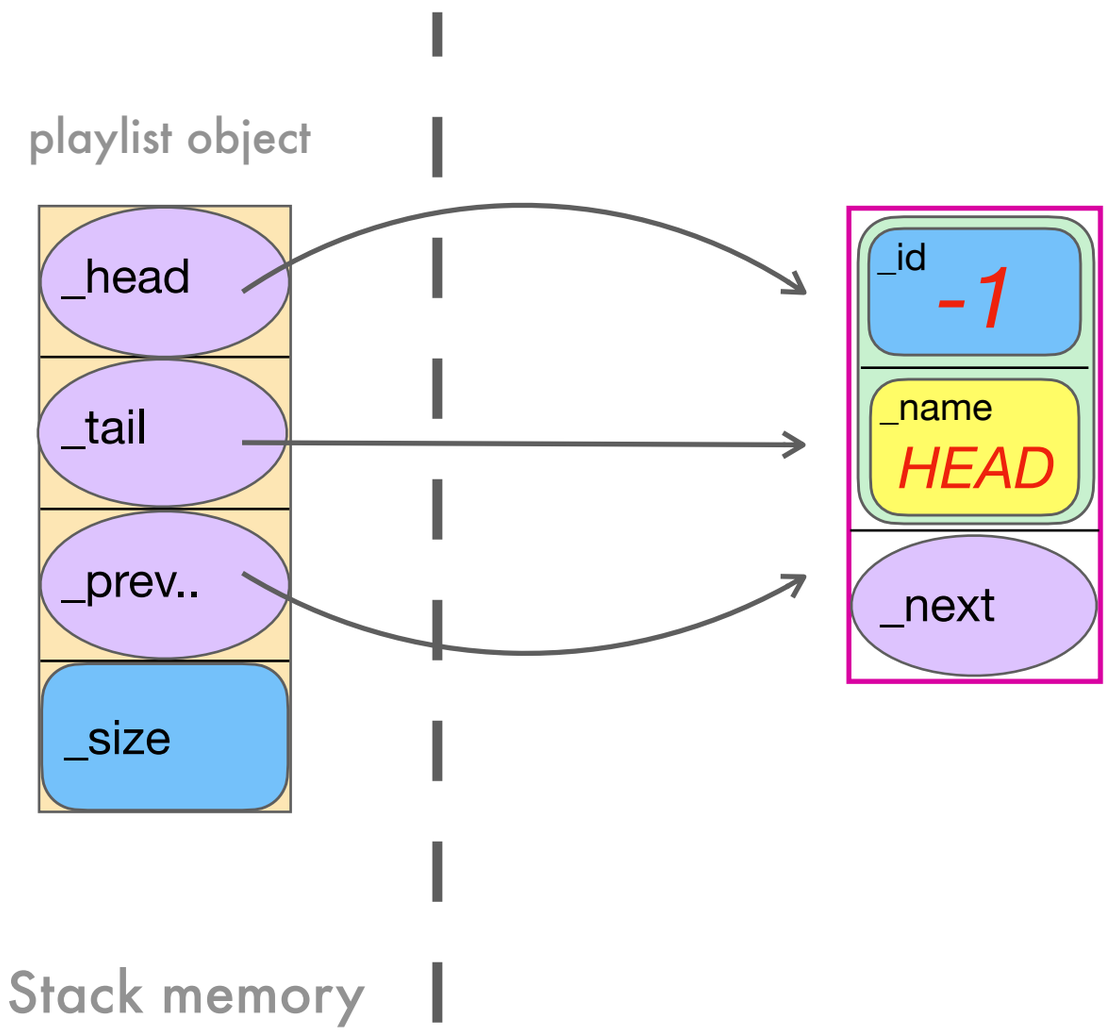
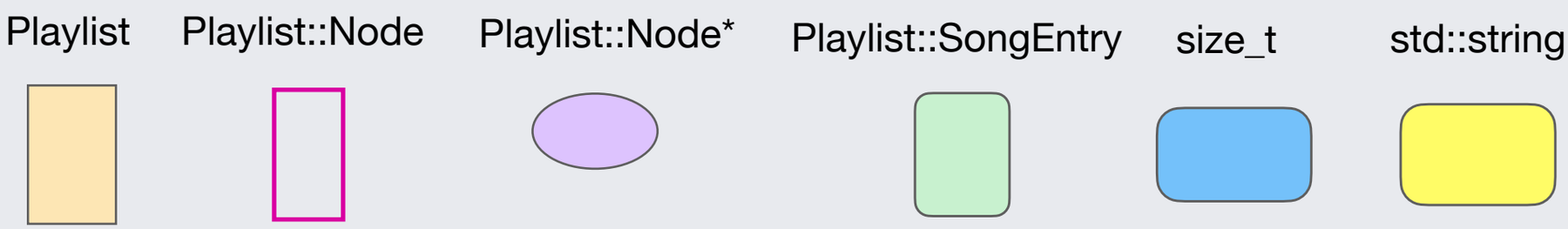




The head sentinel node is an implementation detail and does not represent any user data. Accordingly, _size should initialize to 0.





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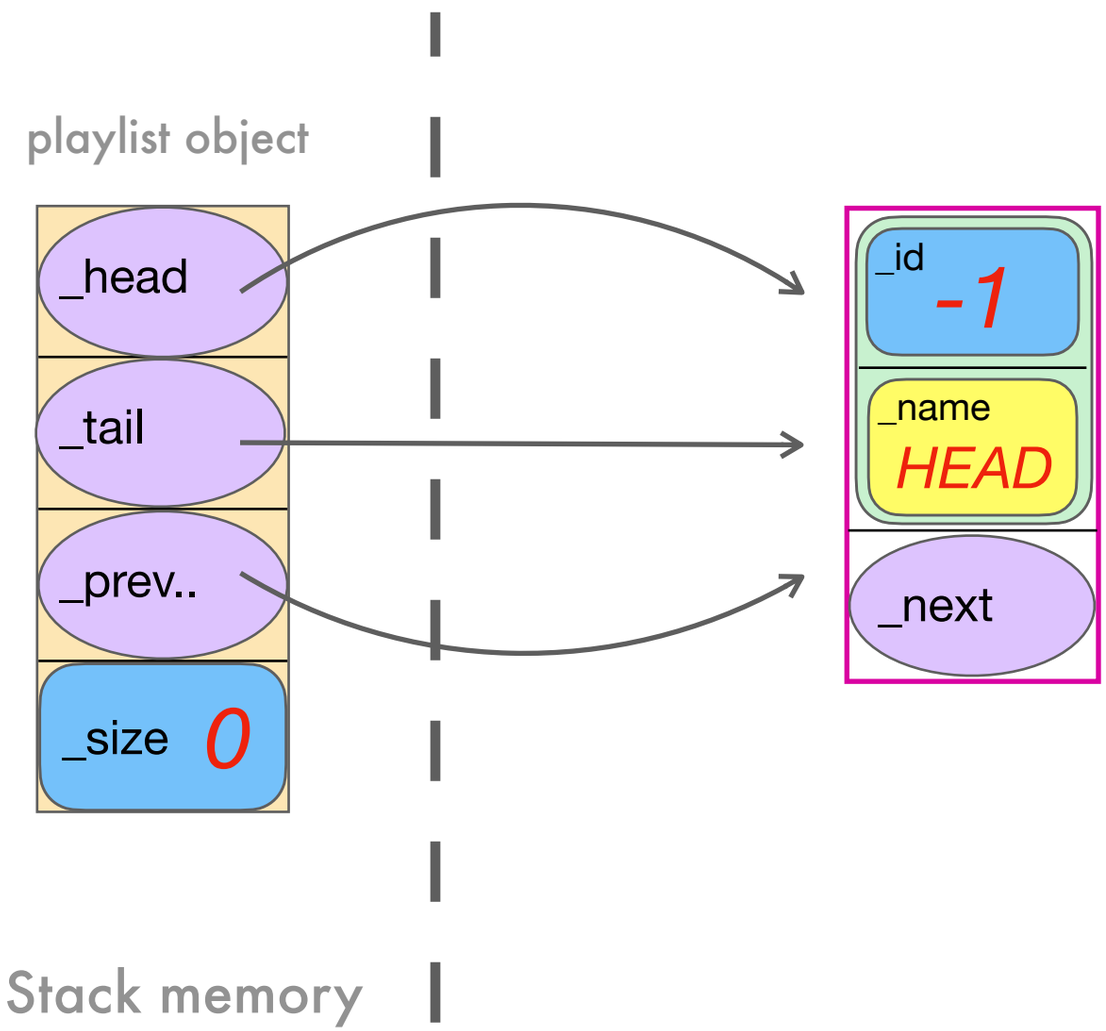
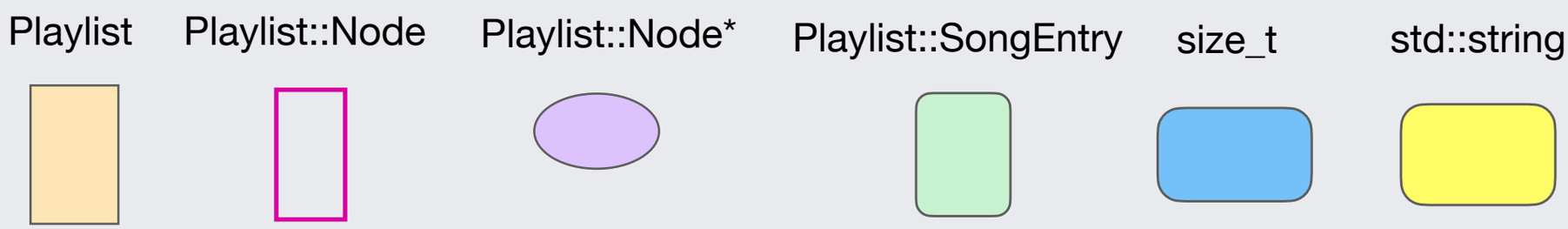
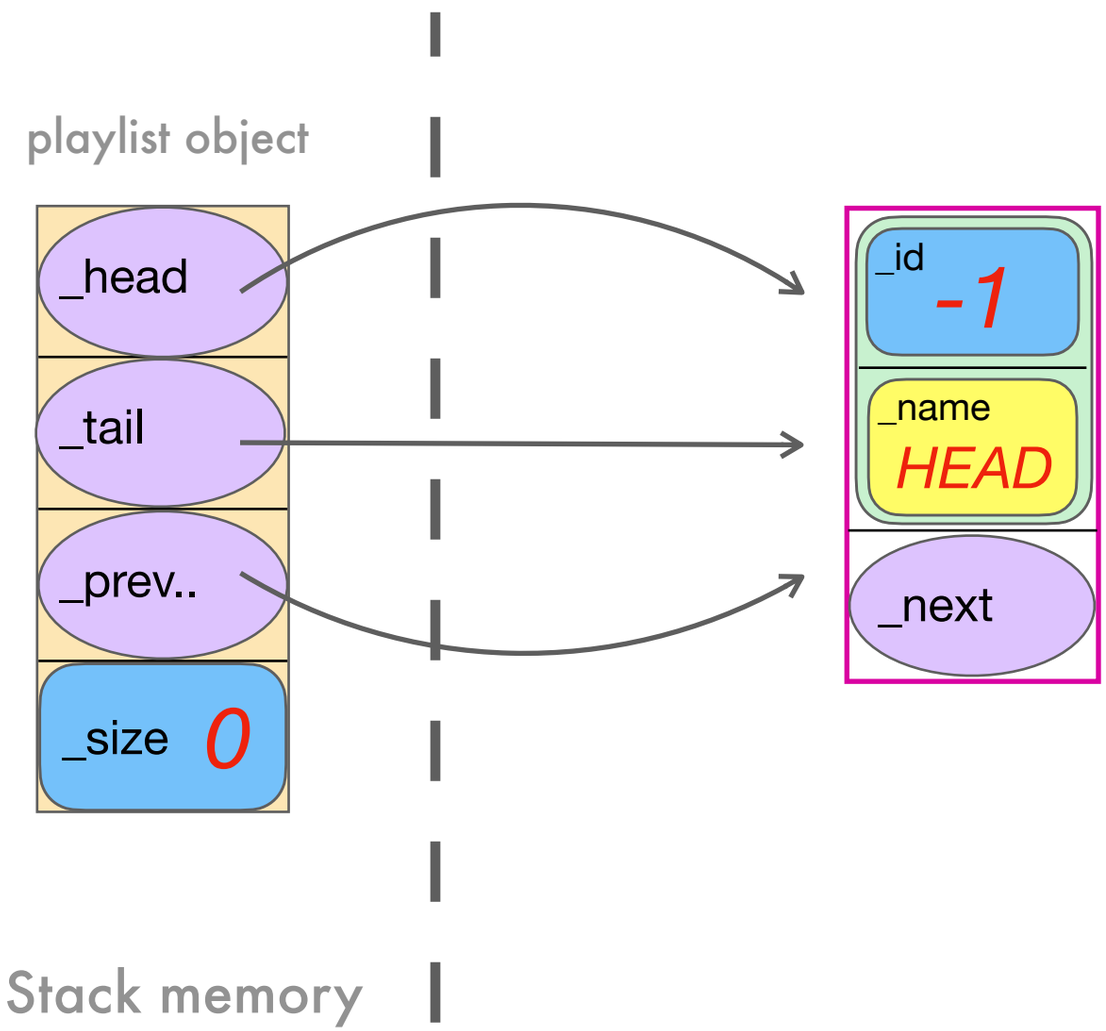
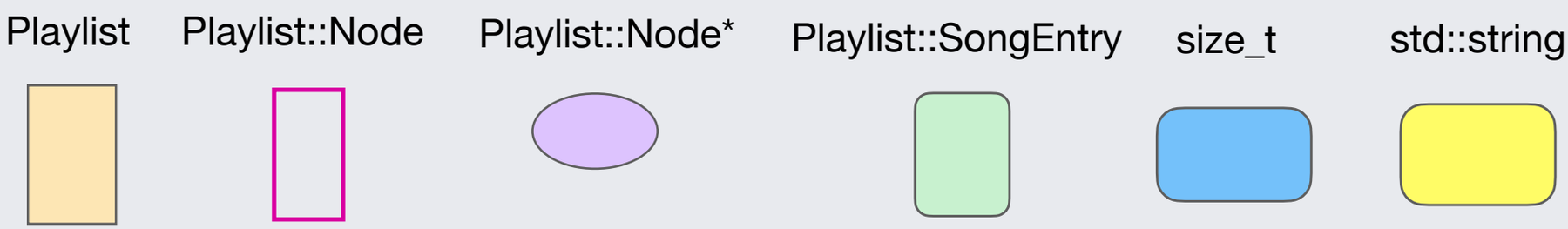




The _next Node* data member should be initialized to nullptr by the Node constructor to avoid pointing at wild (garbage) memory.





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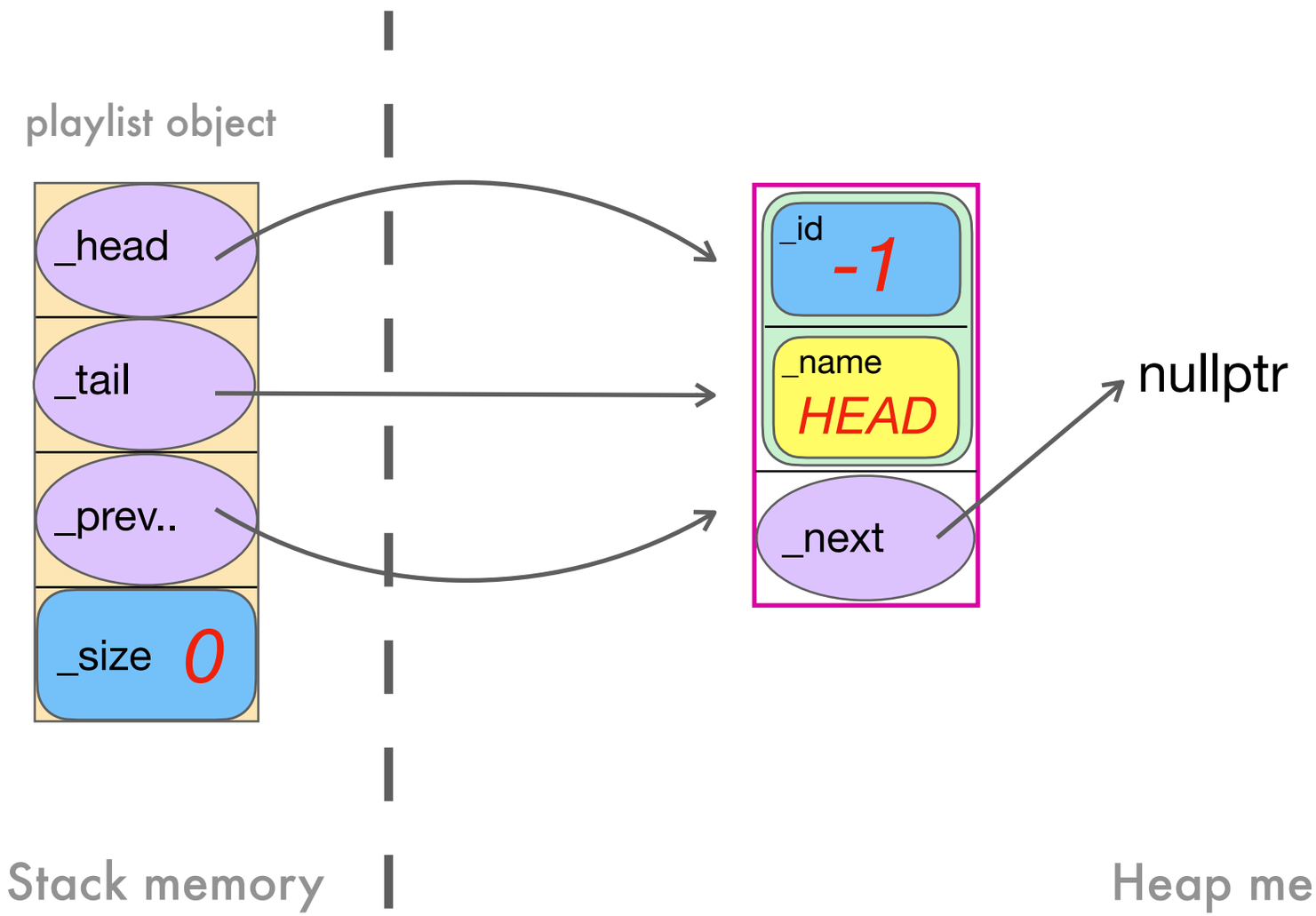
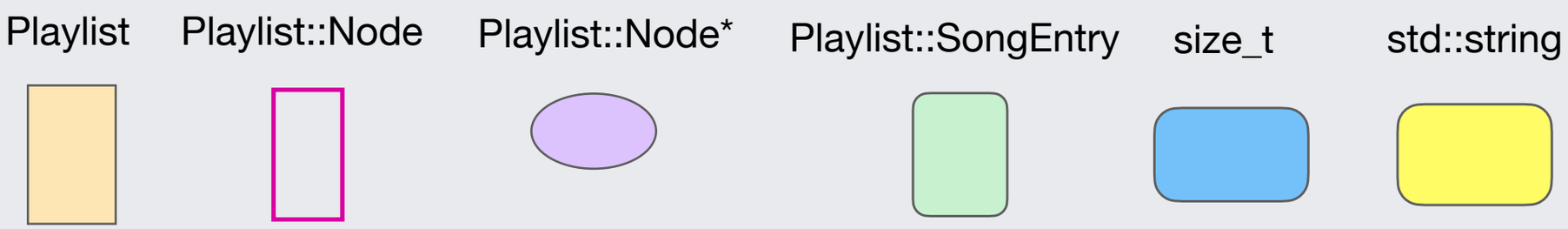
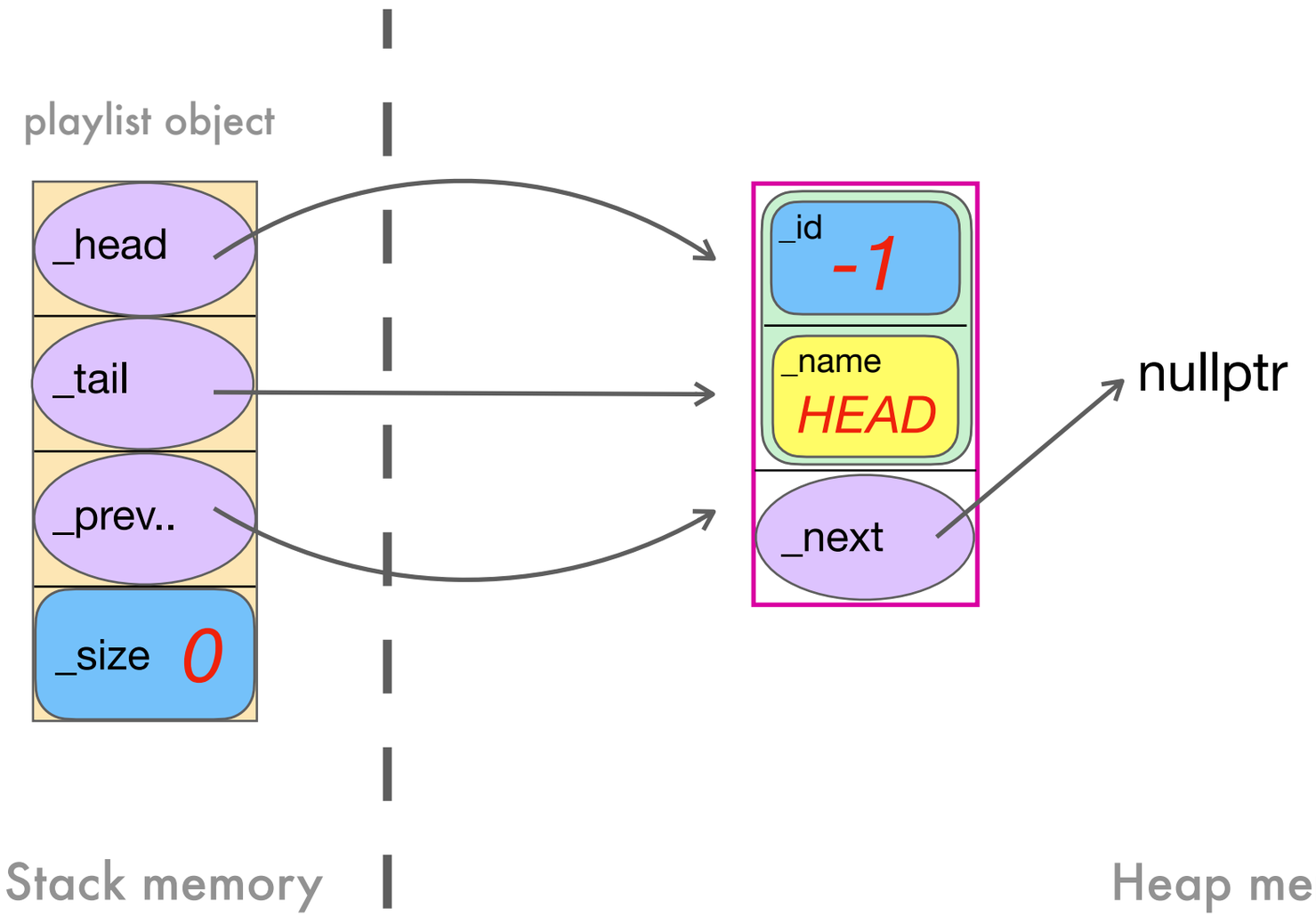
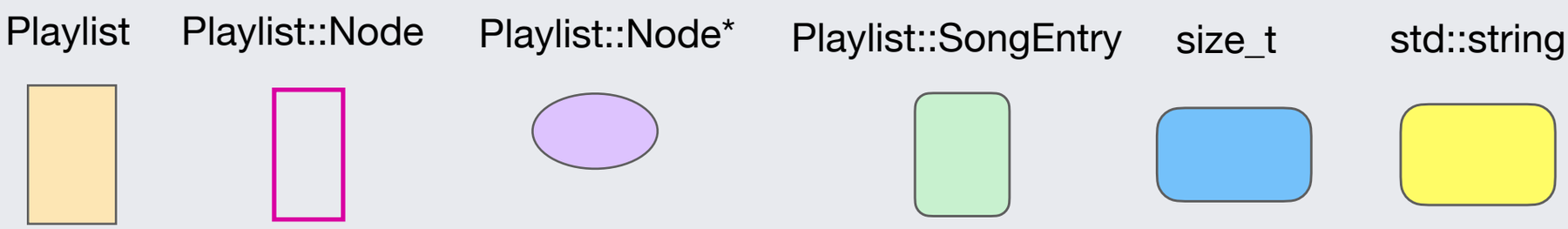




Now, let’s insert some data:

```
playlist.insert_at_cursor(Playlist::SongEntry(10, “A”));
```





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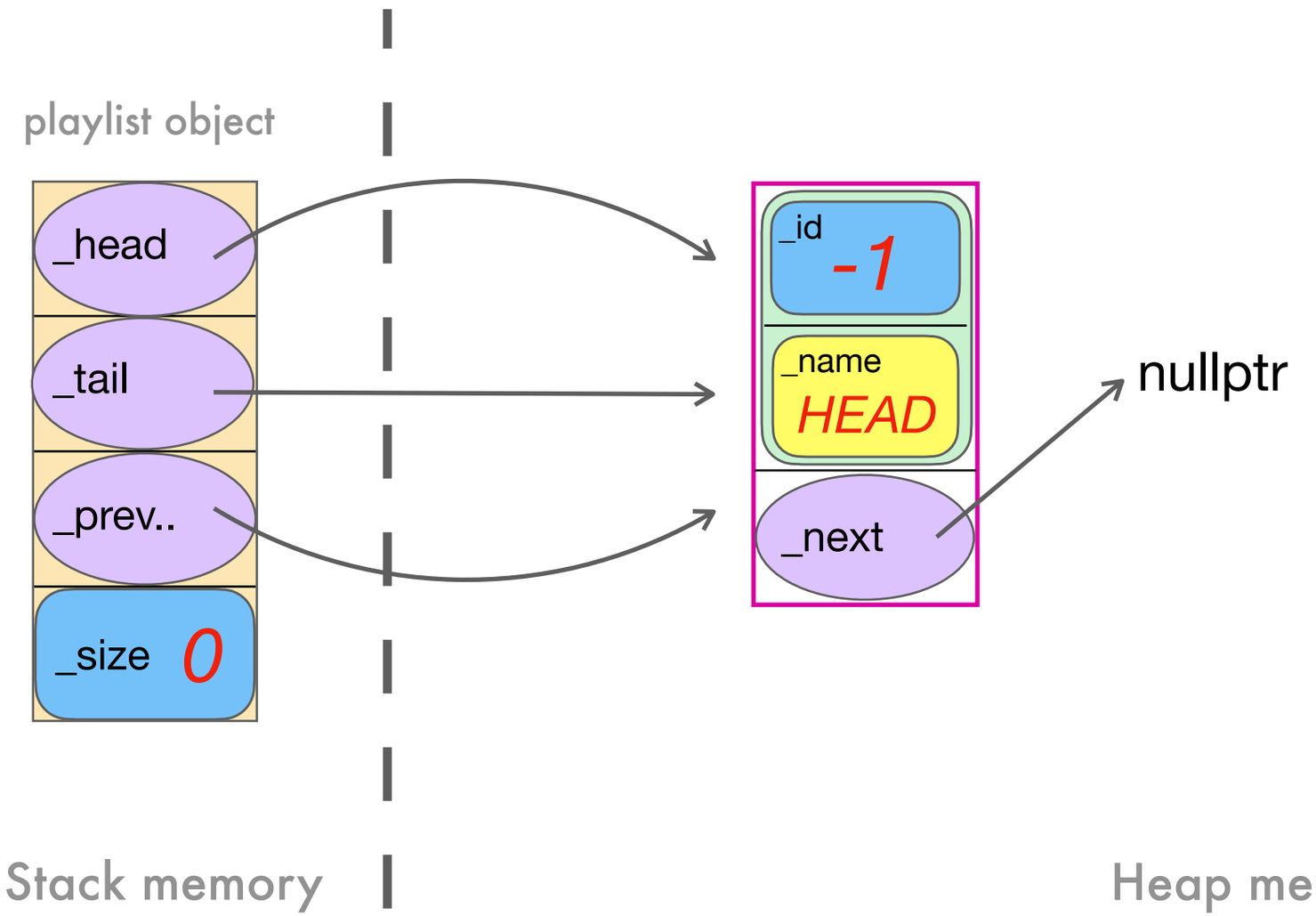

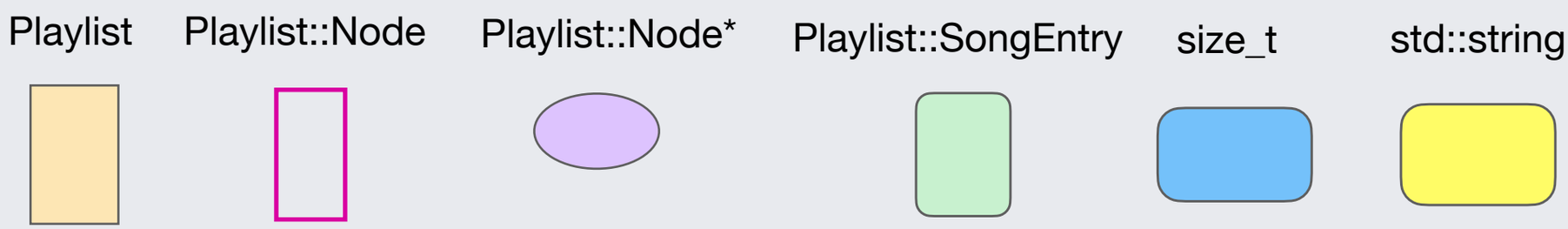

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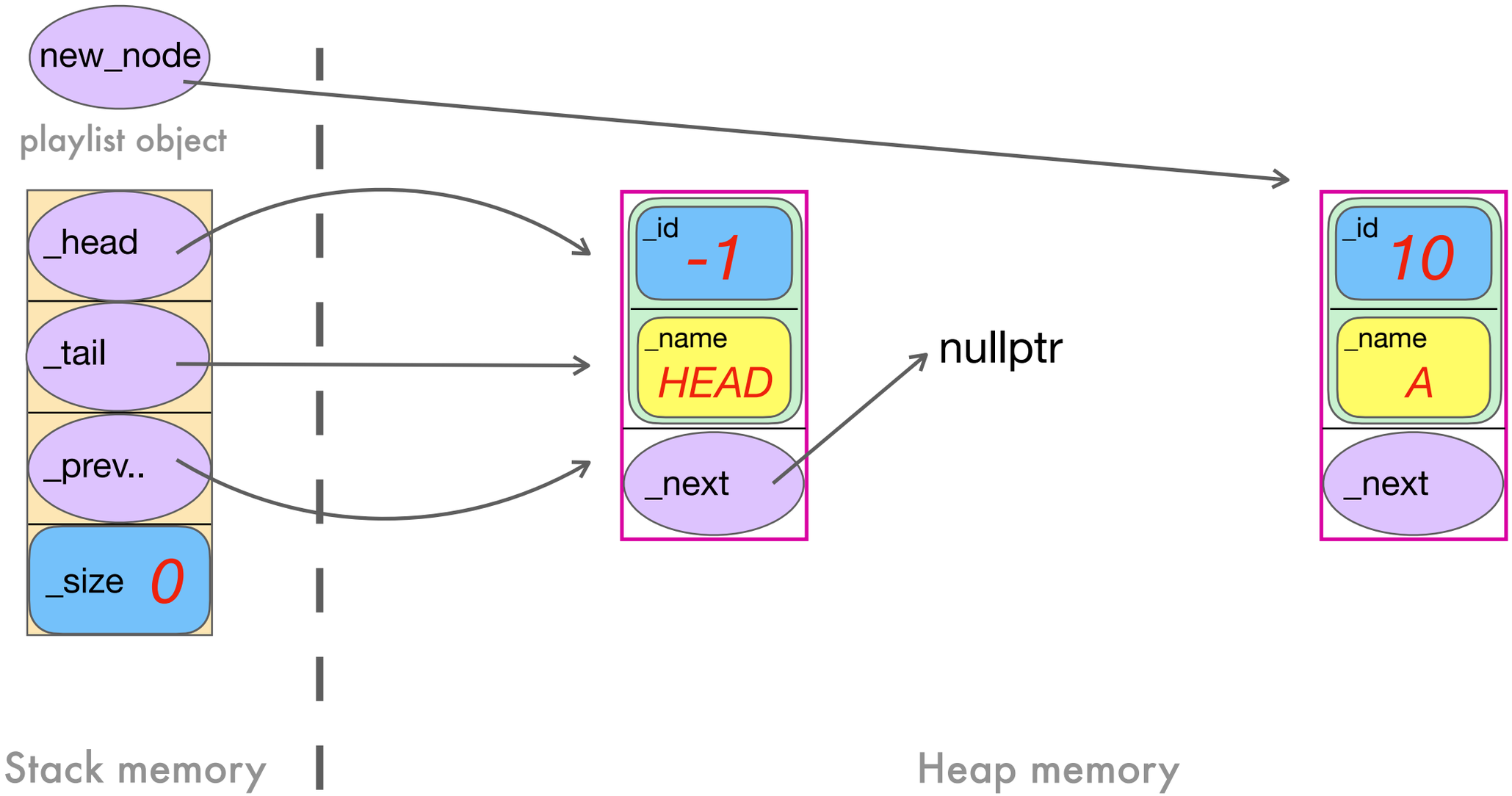
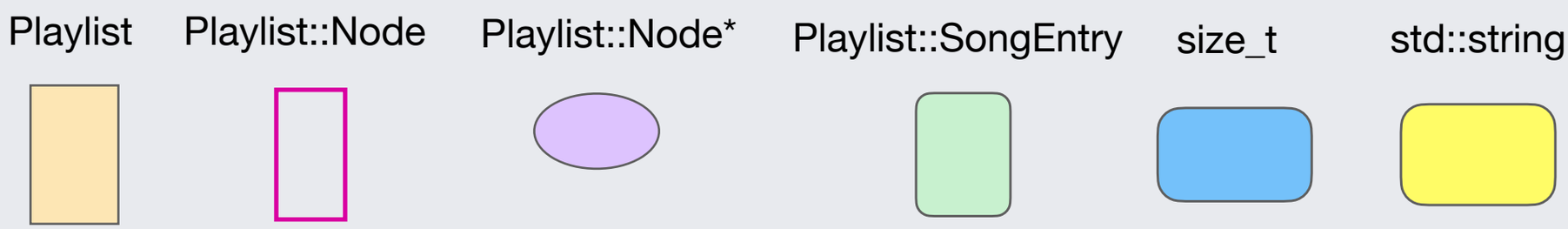
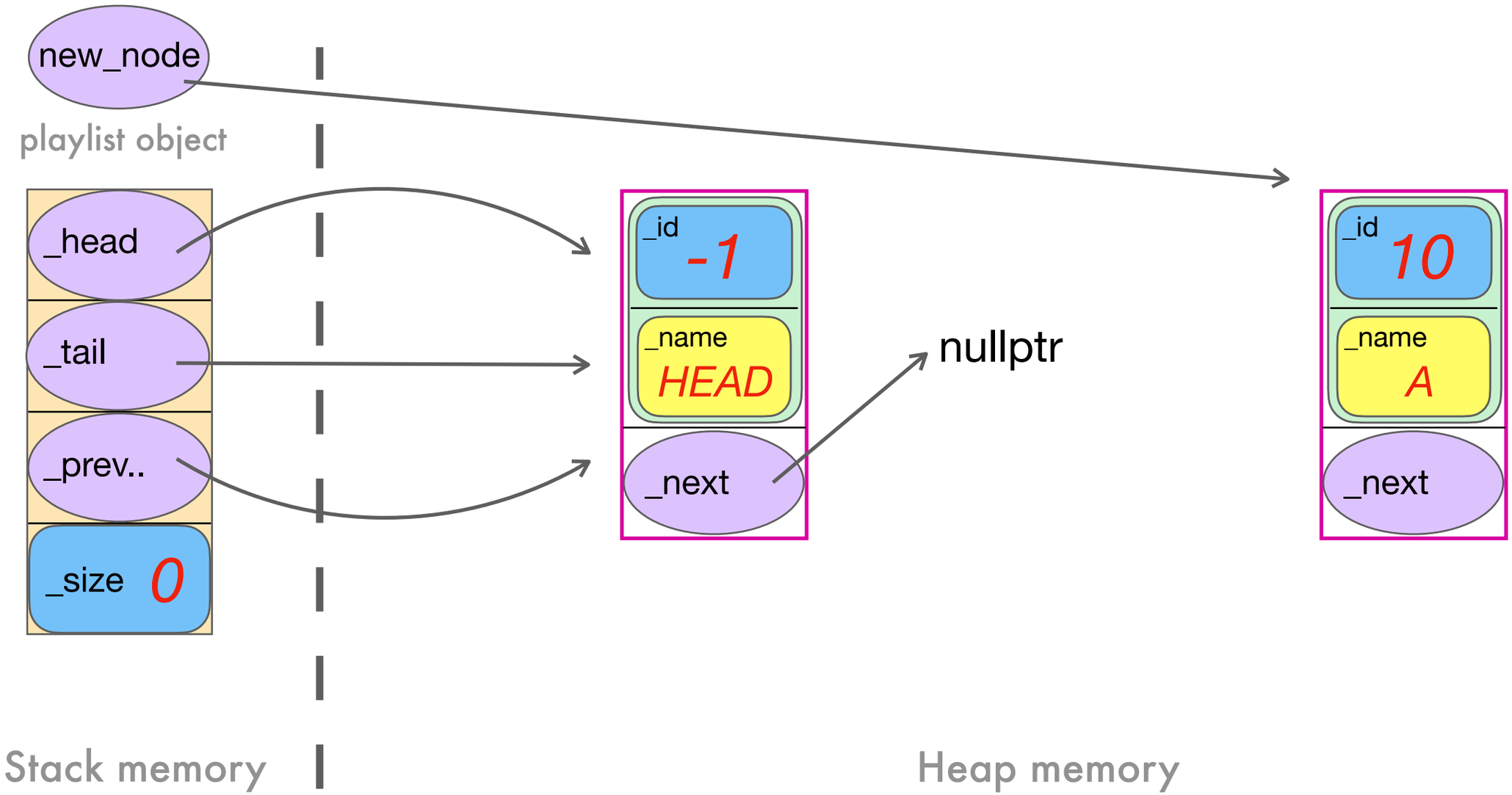
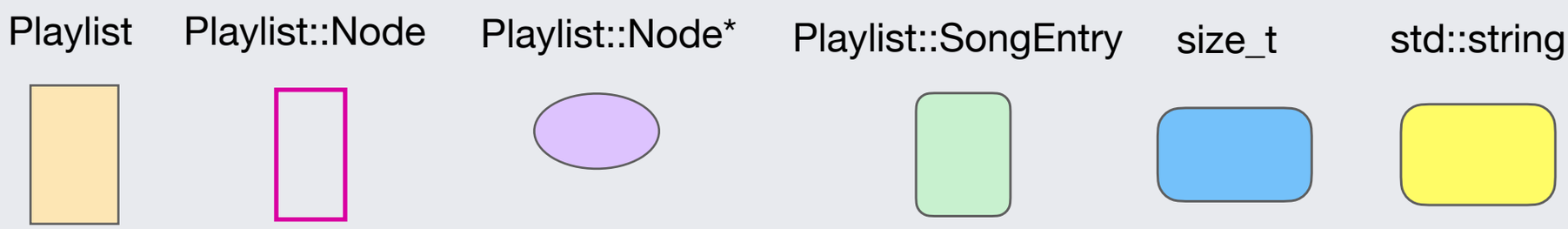




..and link it into the list.





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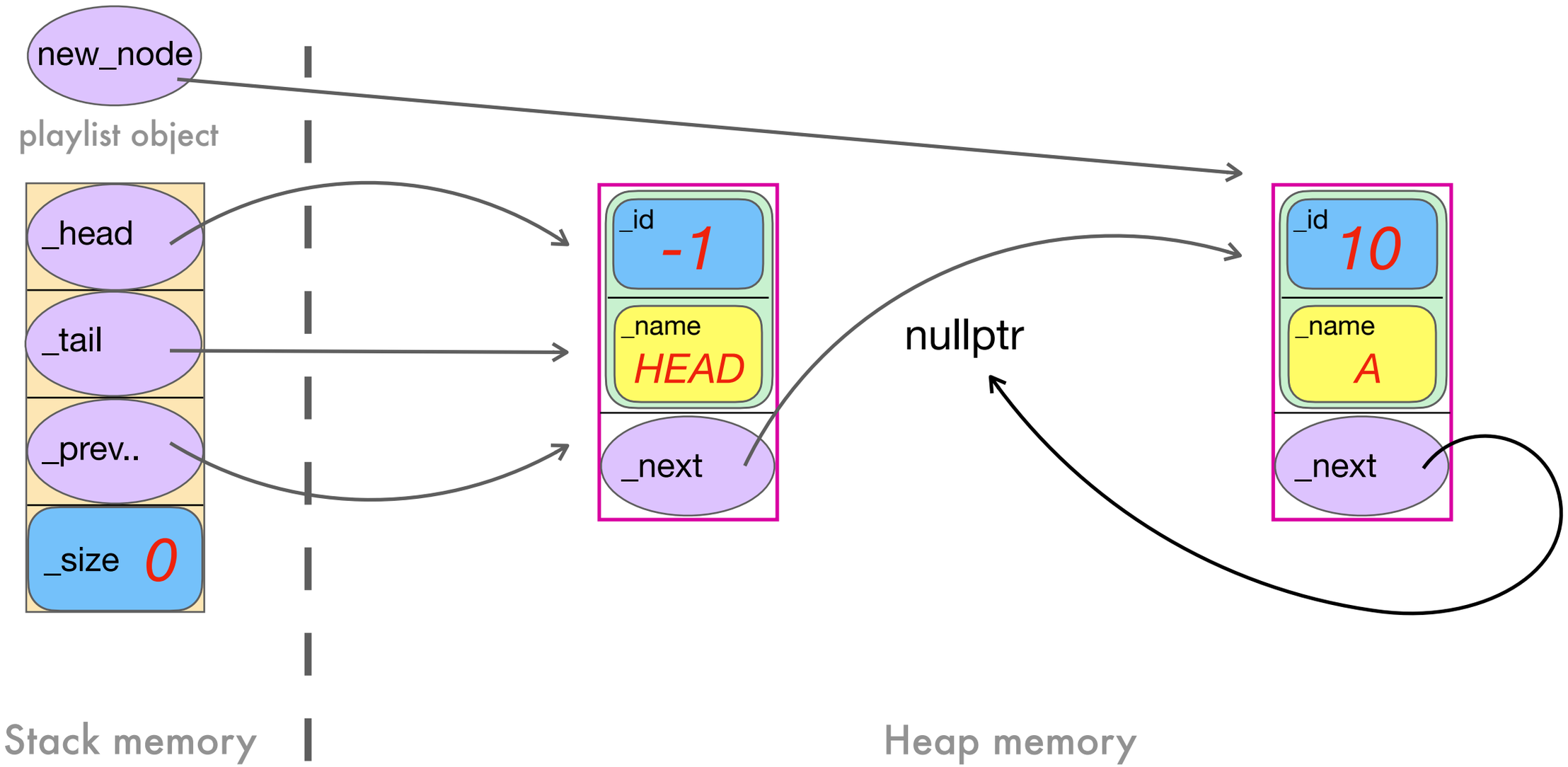

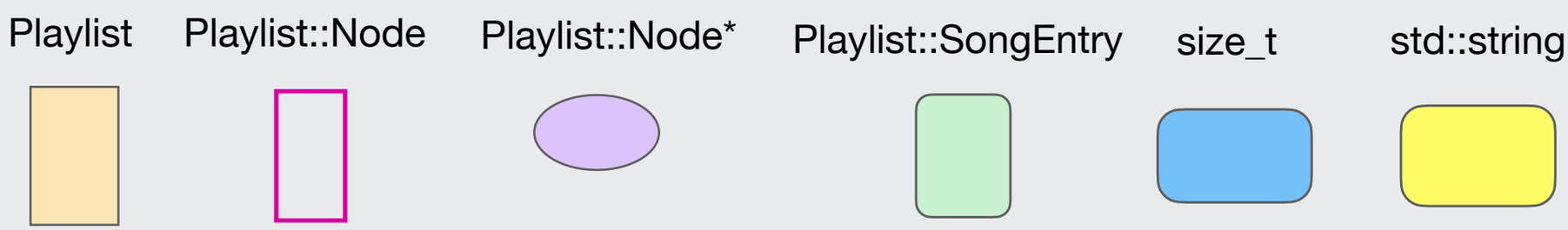

Legend

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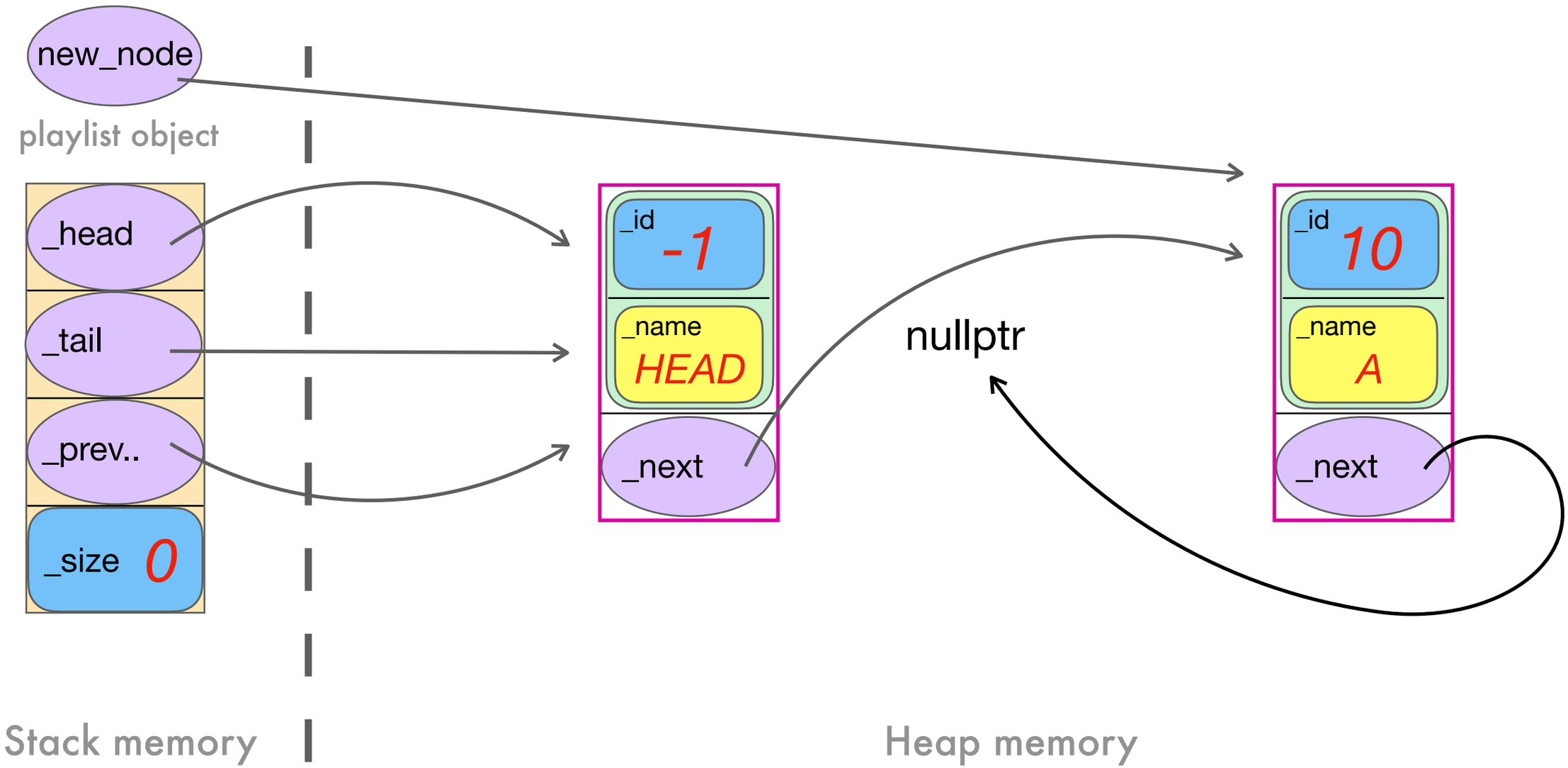

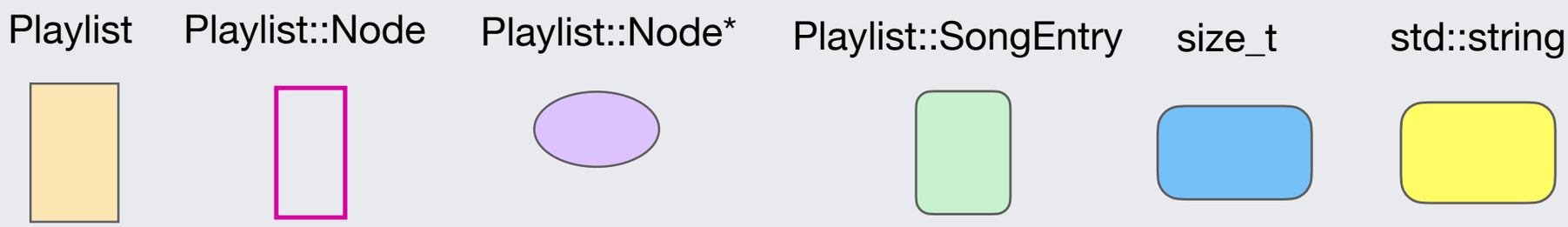

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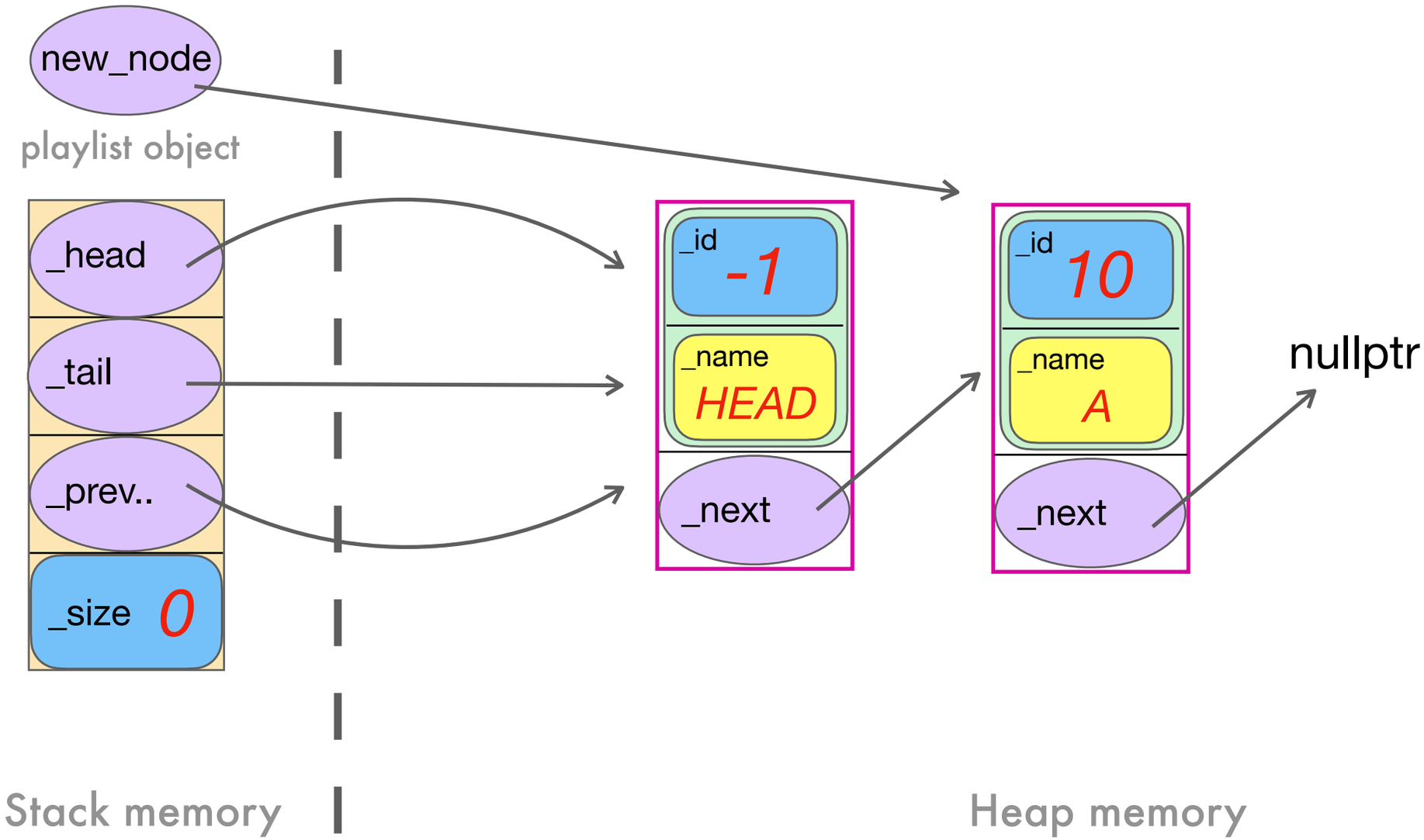
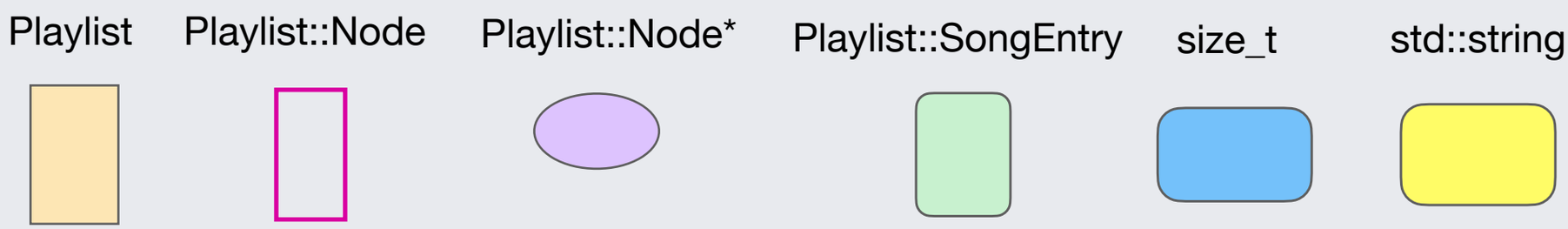
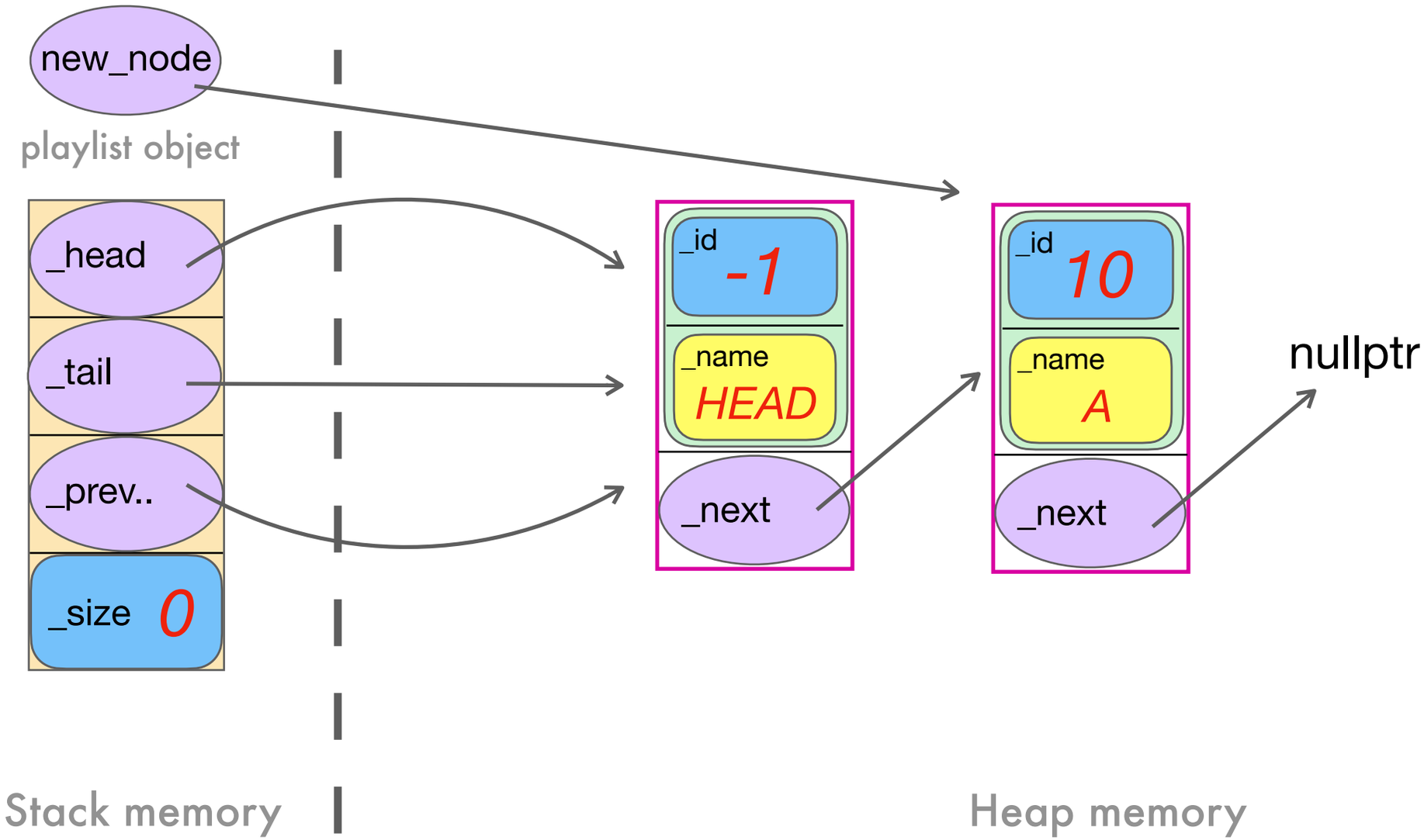
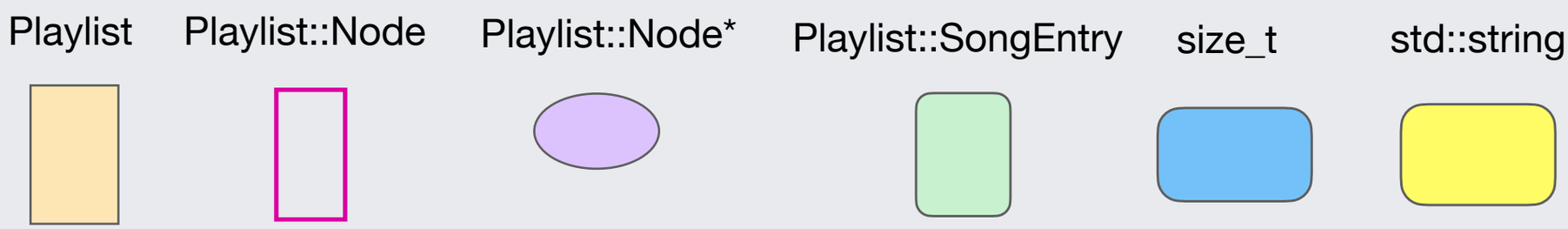




Legend

insert_at_cursor() needs to maintain Playlist data members. In this case, we need to update _tail and _size.





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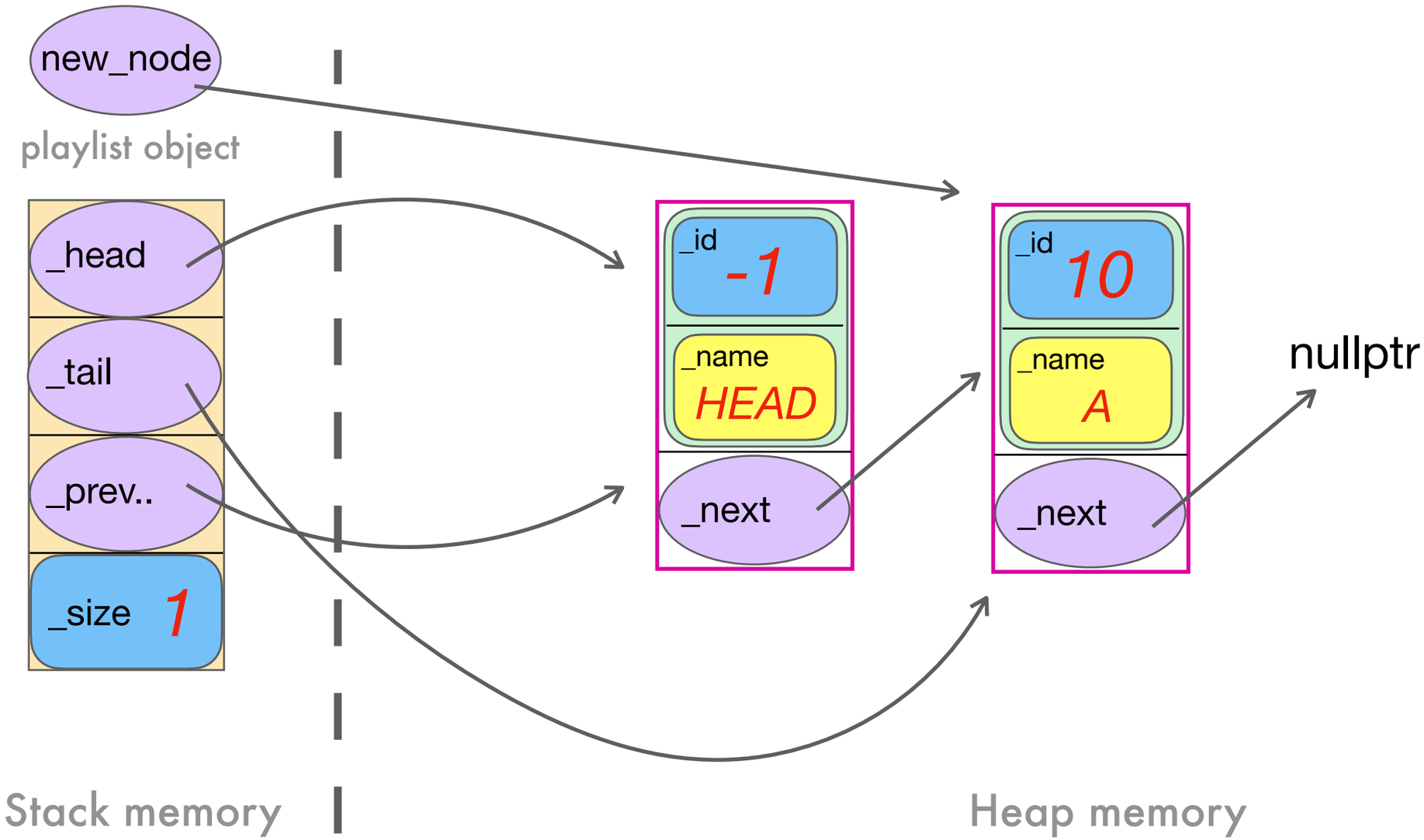
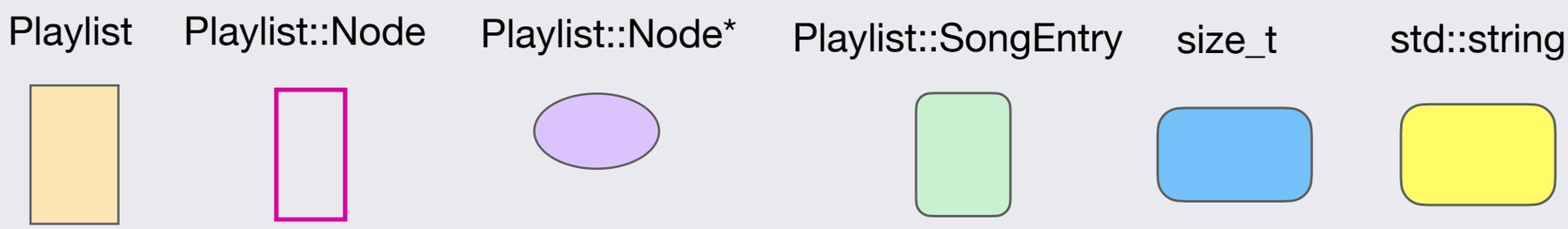
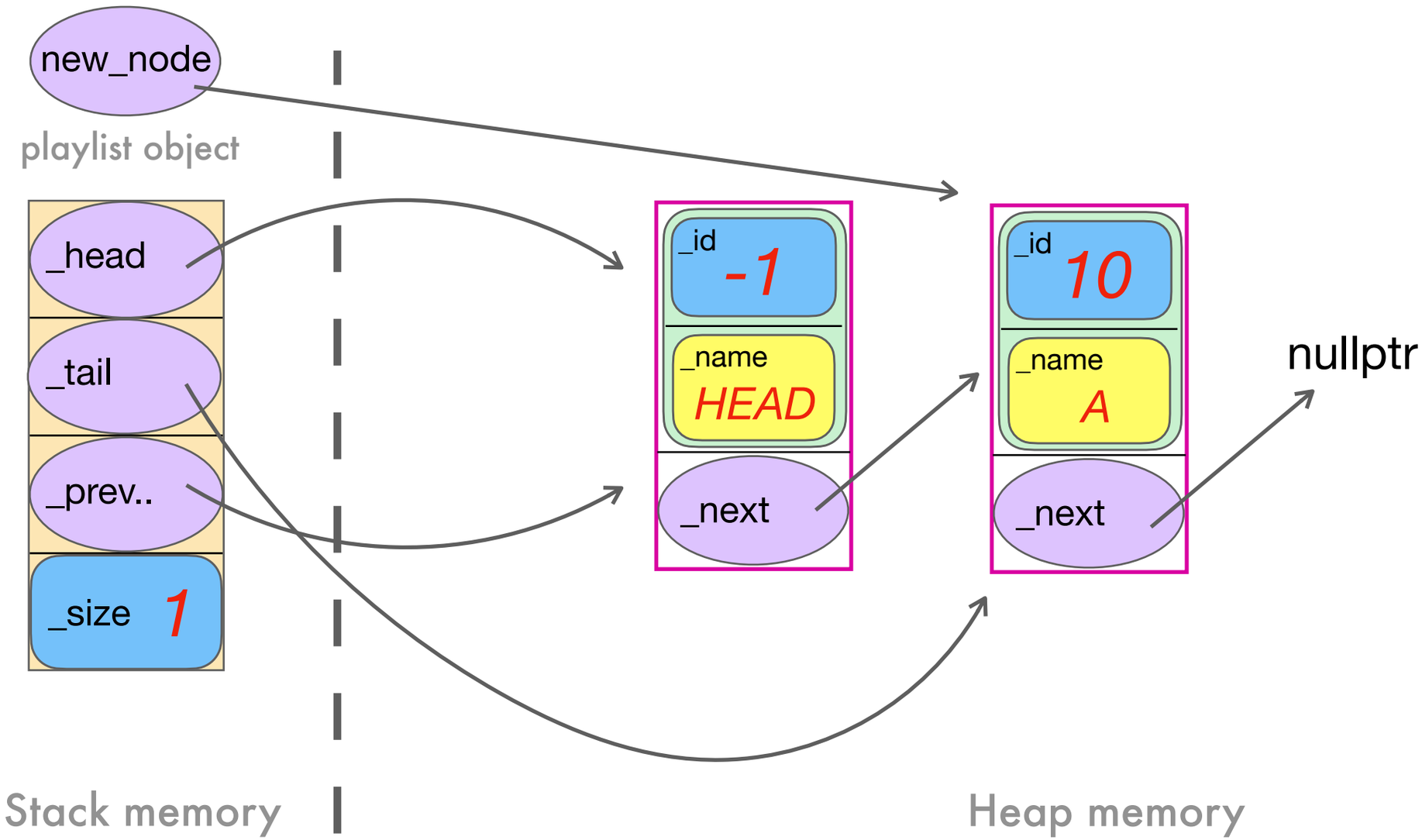
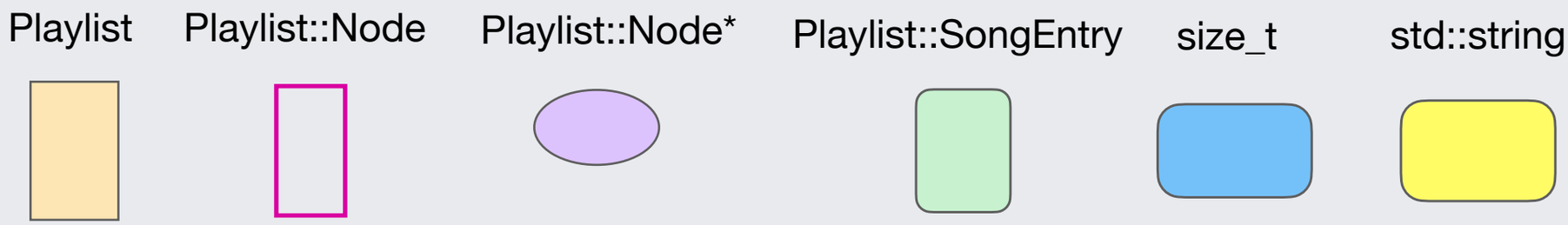


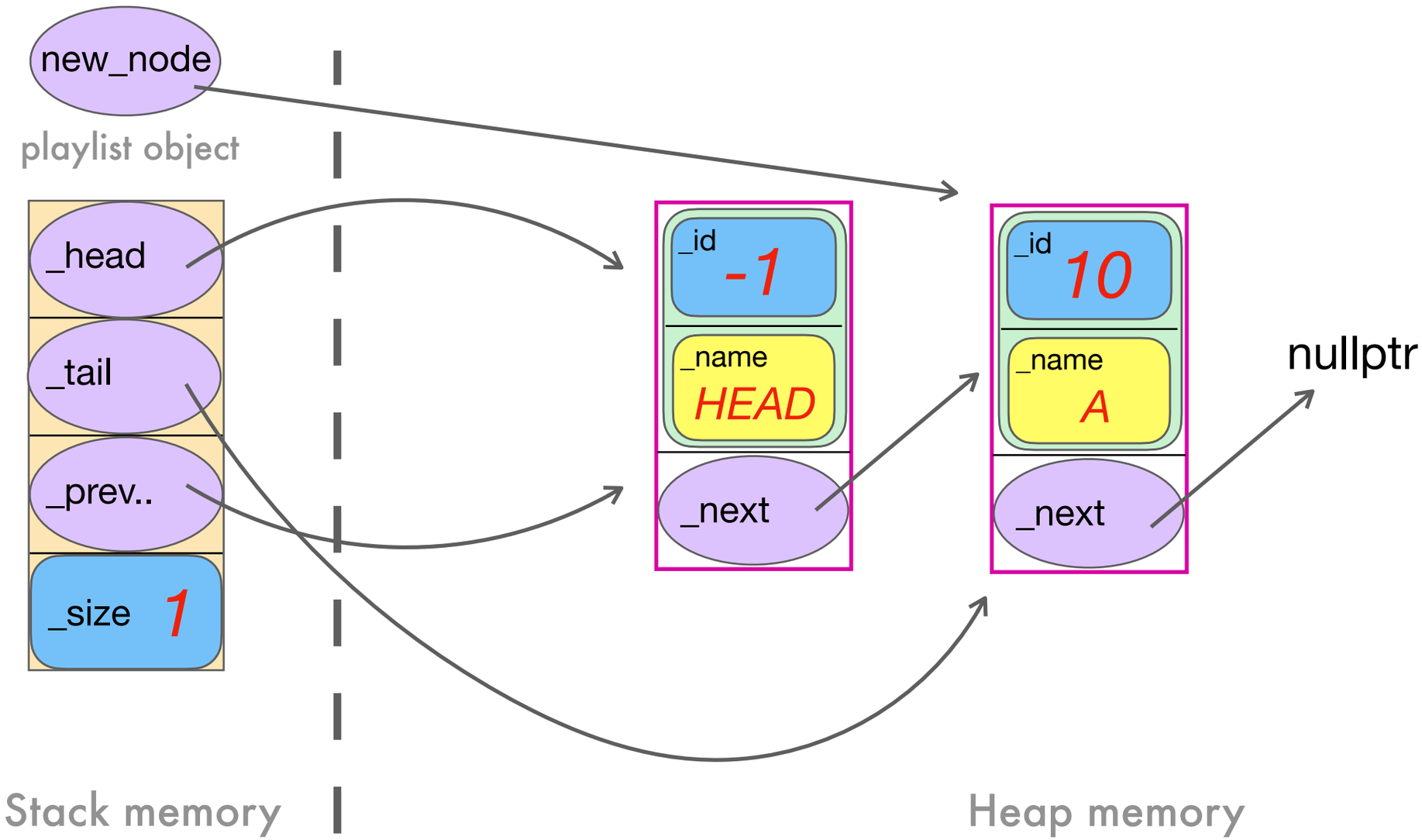


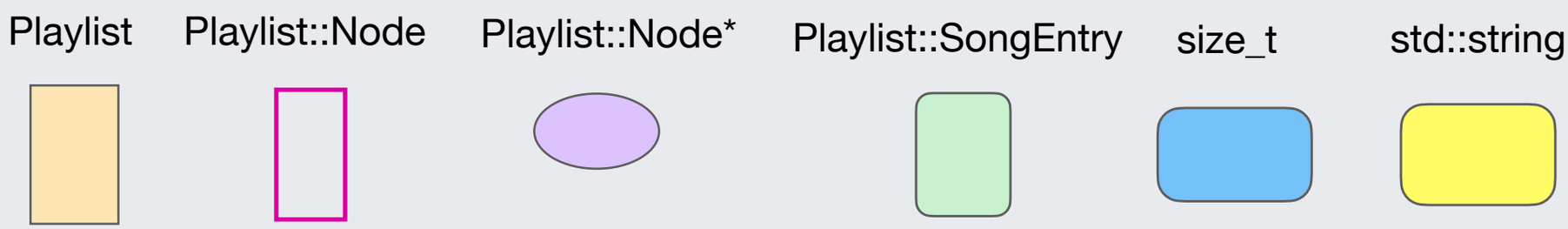
Neither _head nor _previous_to_current move. Indeed, _head will never move. It always points at the head sentinel node and is our way in to the list.





When insert_at_cursor() returns, the temporary local Node* new_node will be destroyed, but the node itself in heap memory is now accessible via the list, via the sentinel node.





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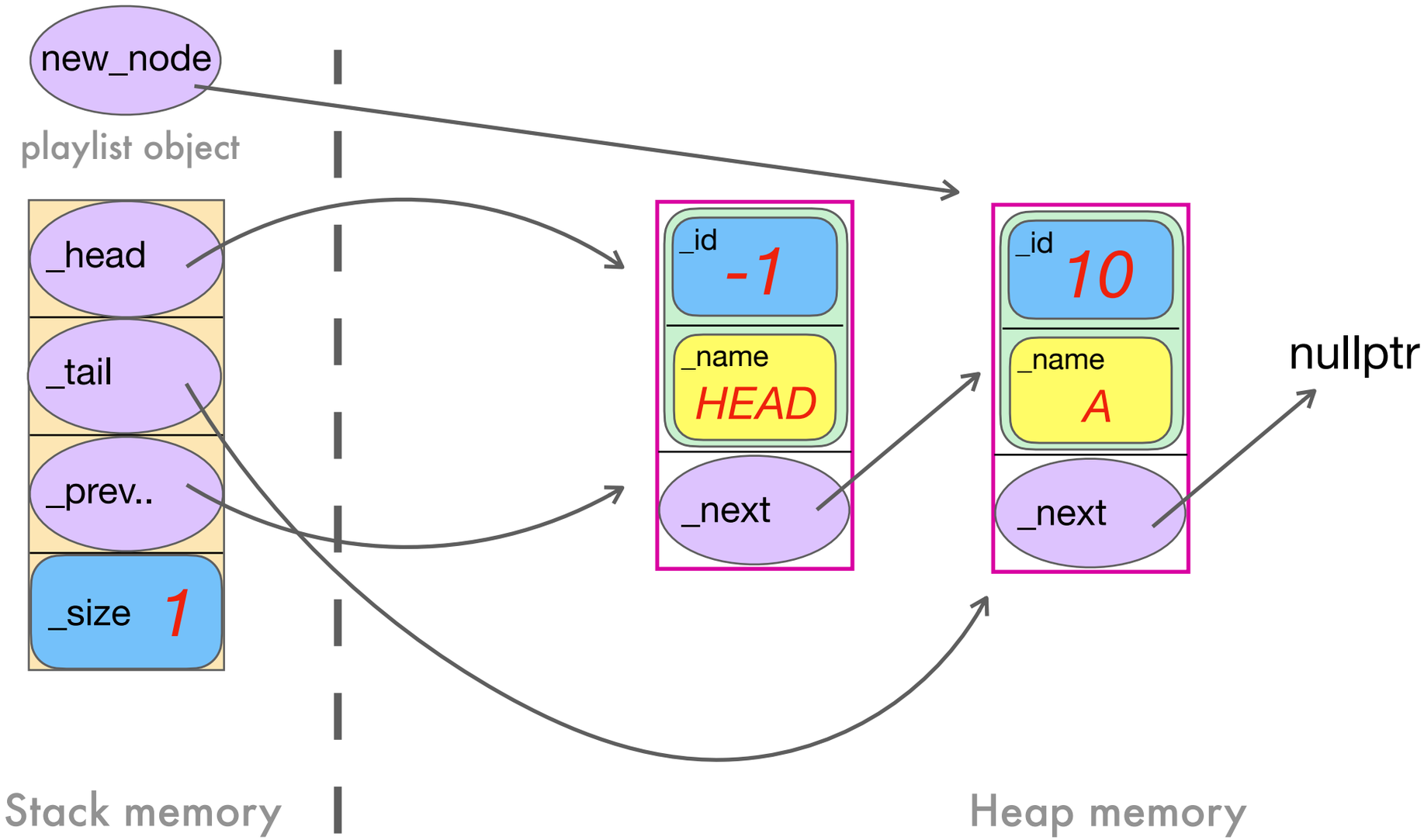

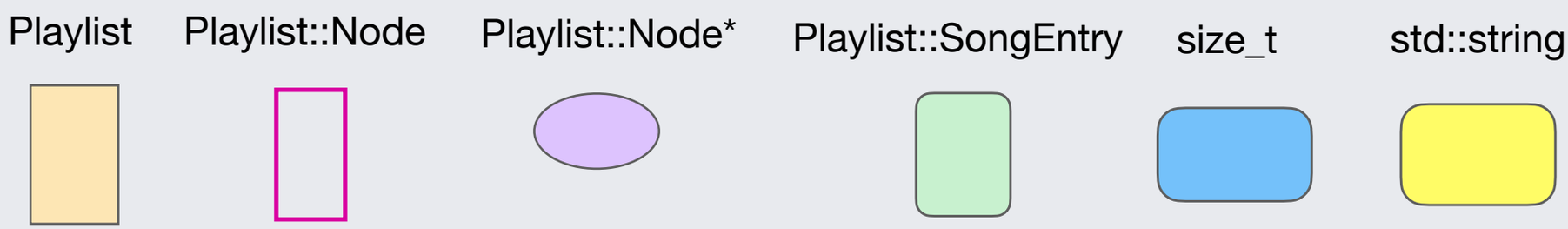

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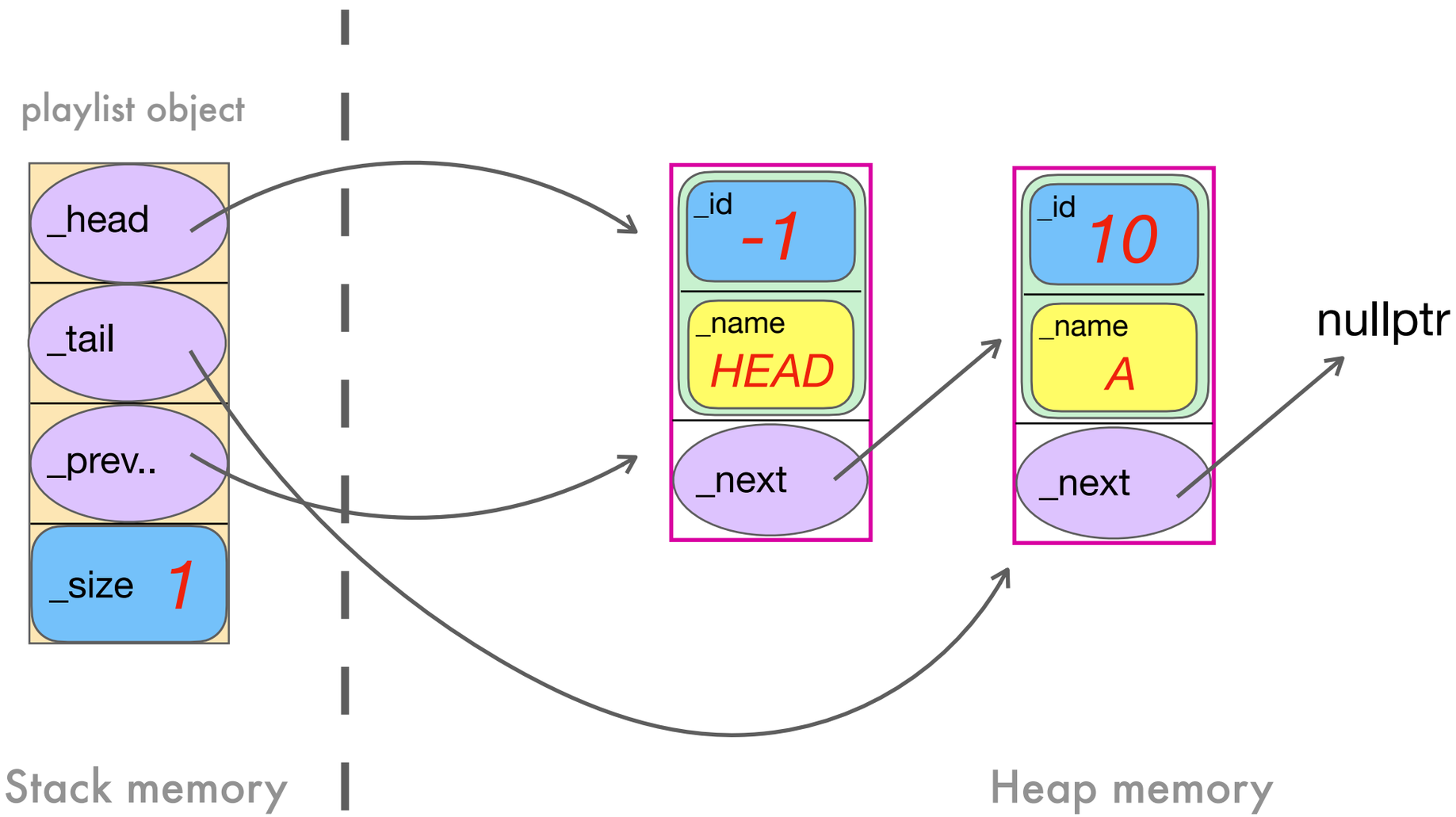
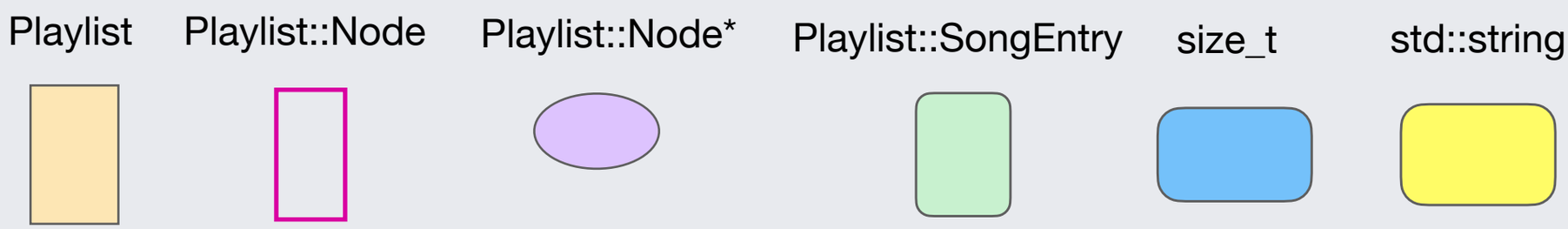
Let’s insert another song:

```
playlist.insert_at_cursor(Playlist::SongEntry(20, “B”));
```





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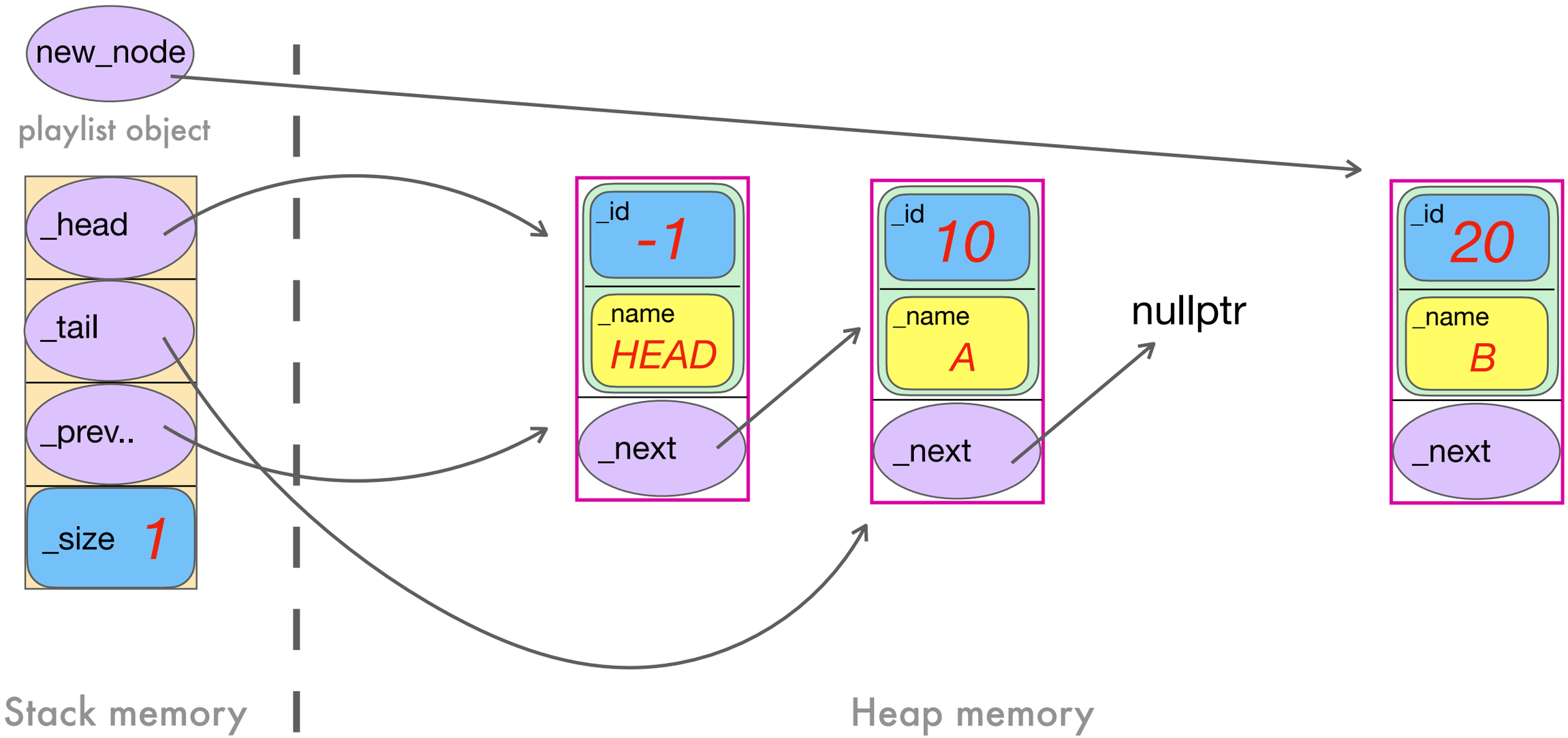

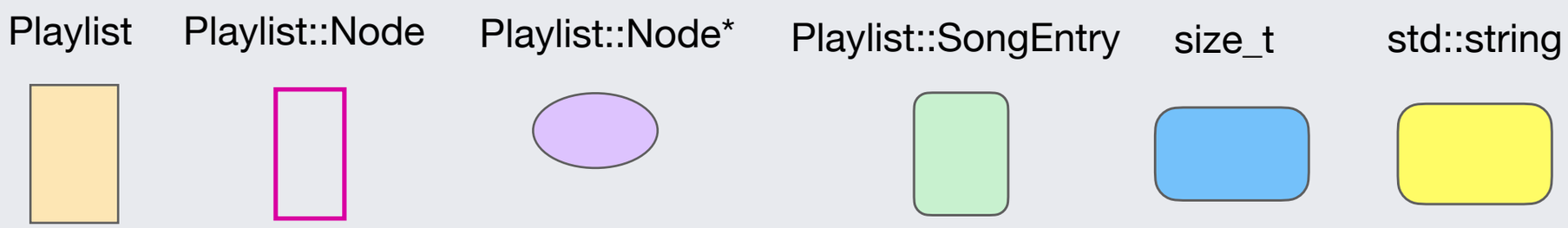

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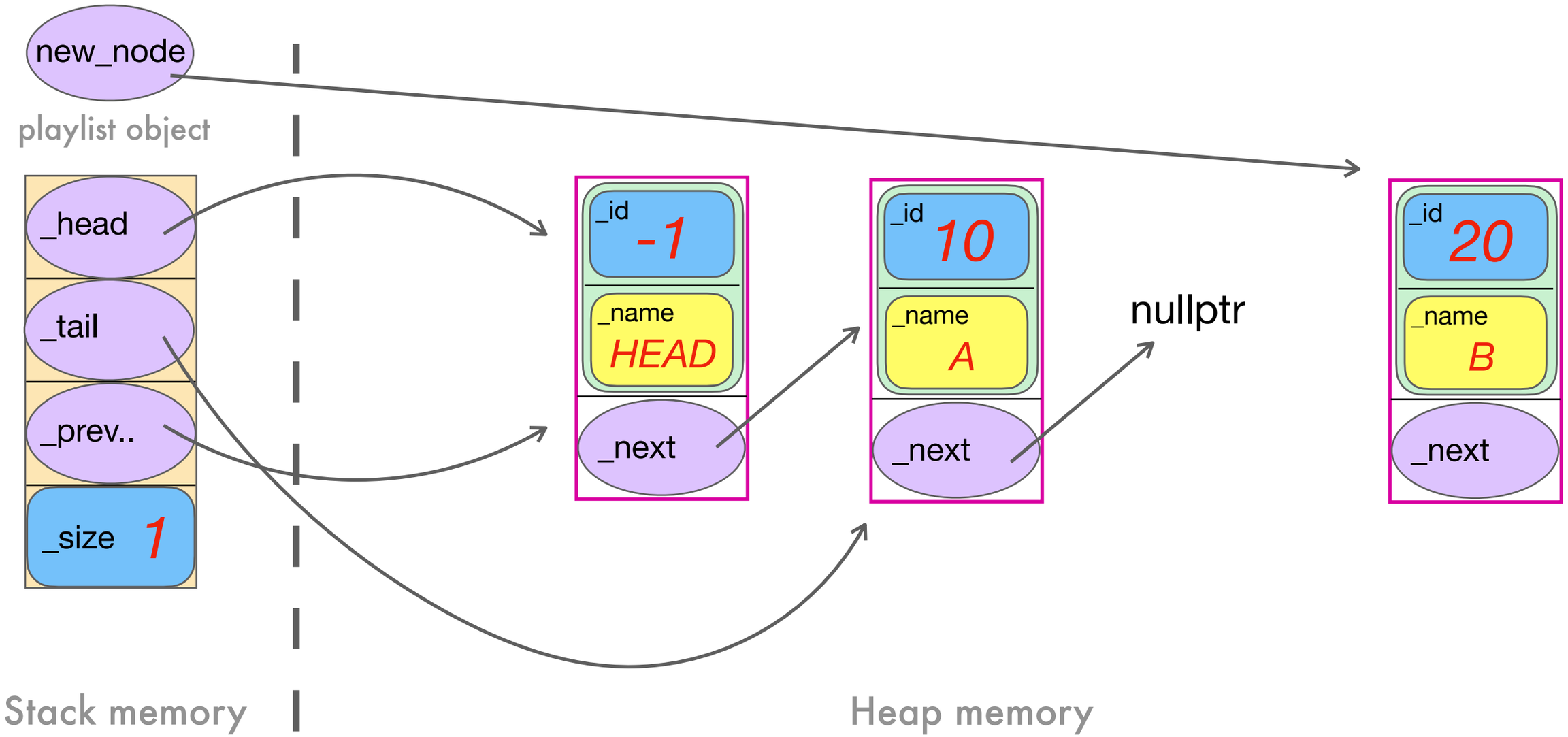
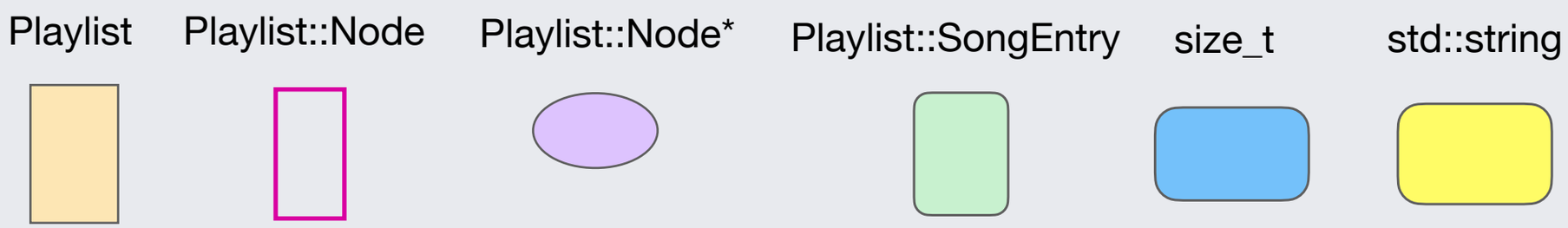
We're inserting after _prev_to_current which right now points to the sentinel node. So we need to carefully re-assign _next pointers..





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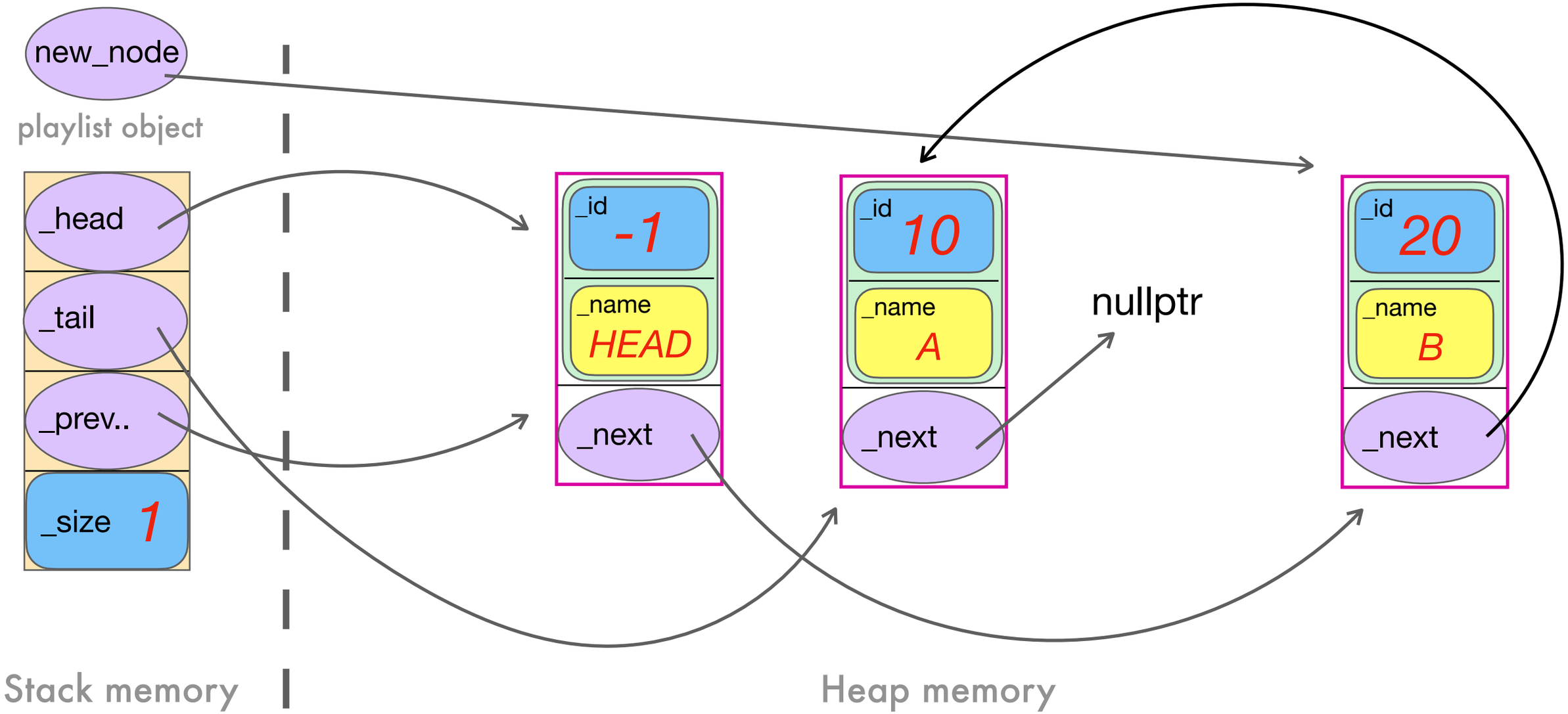

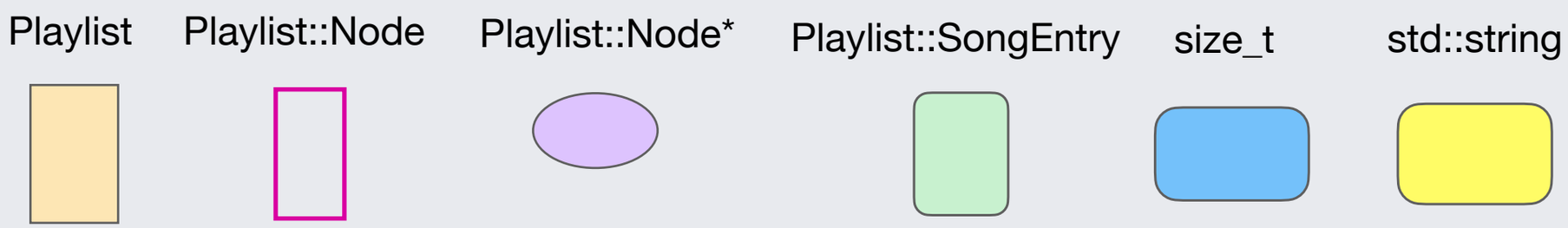

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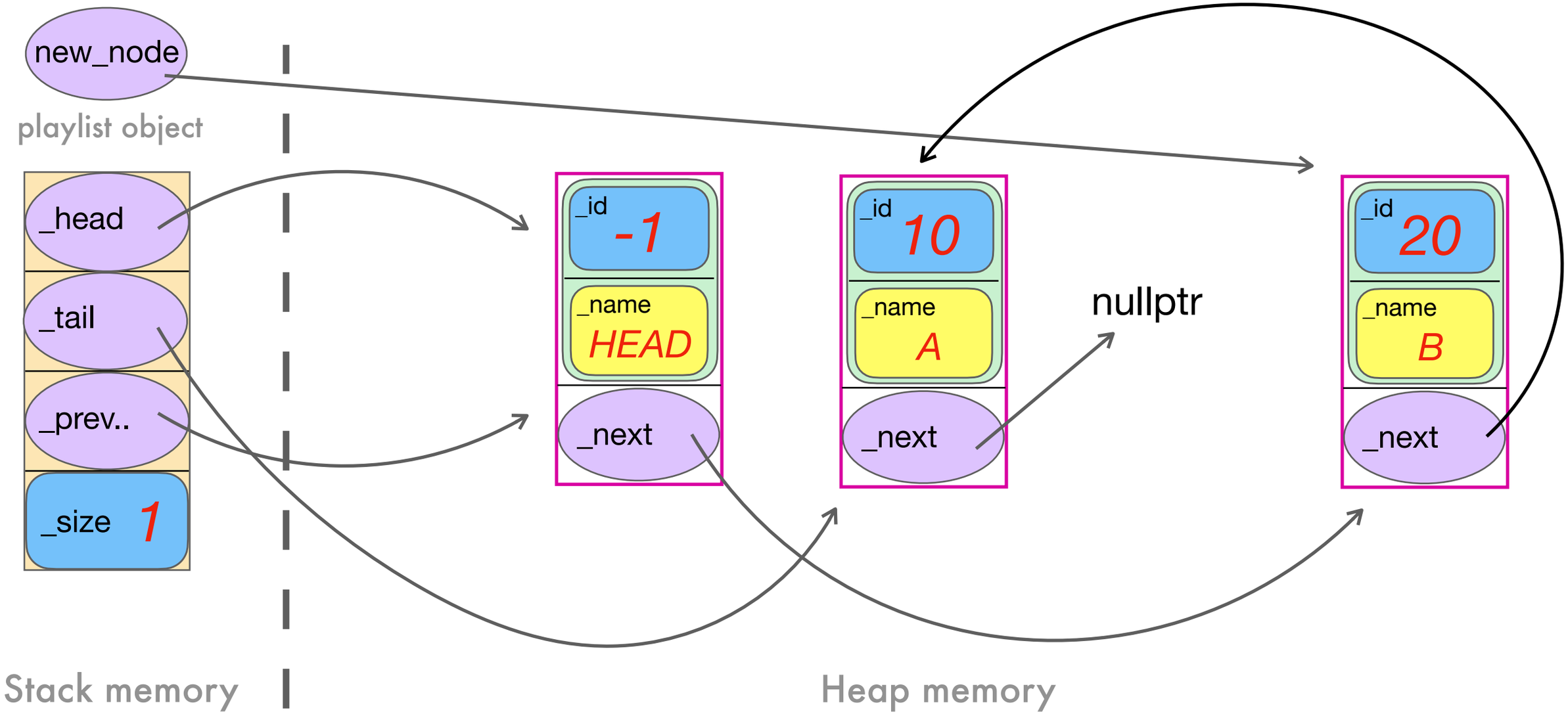

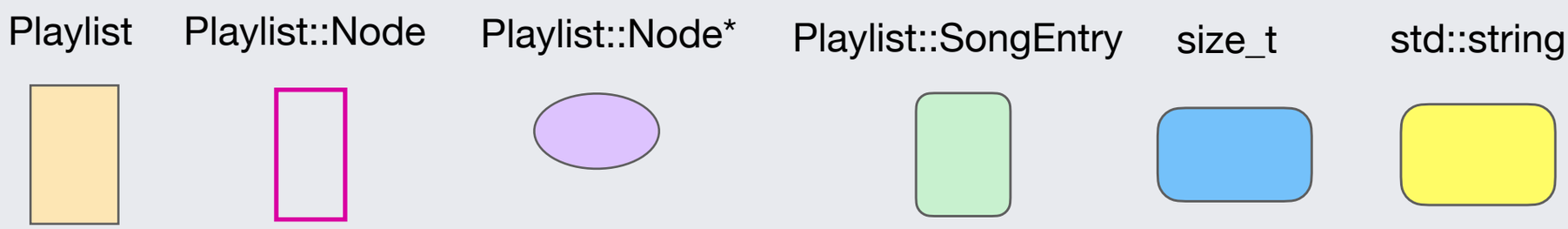

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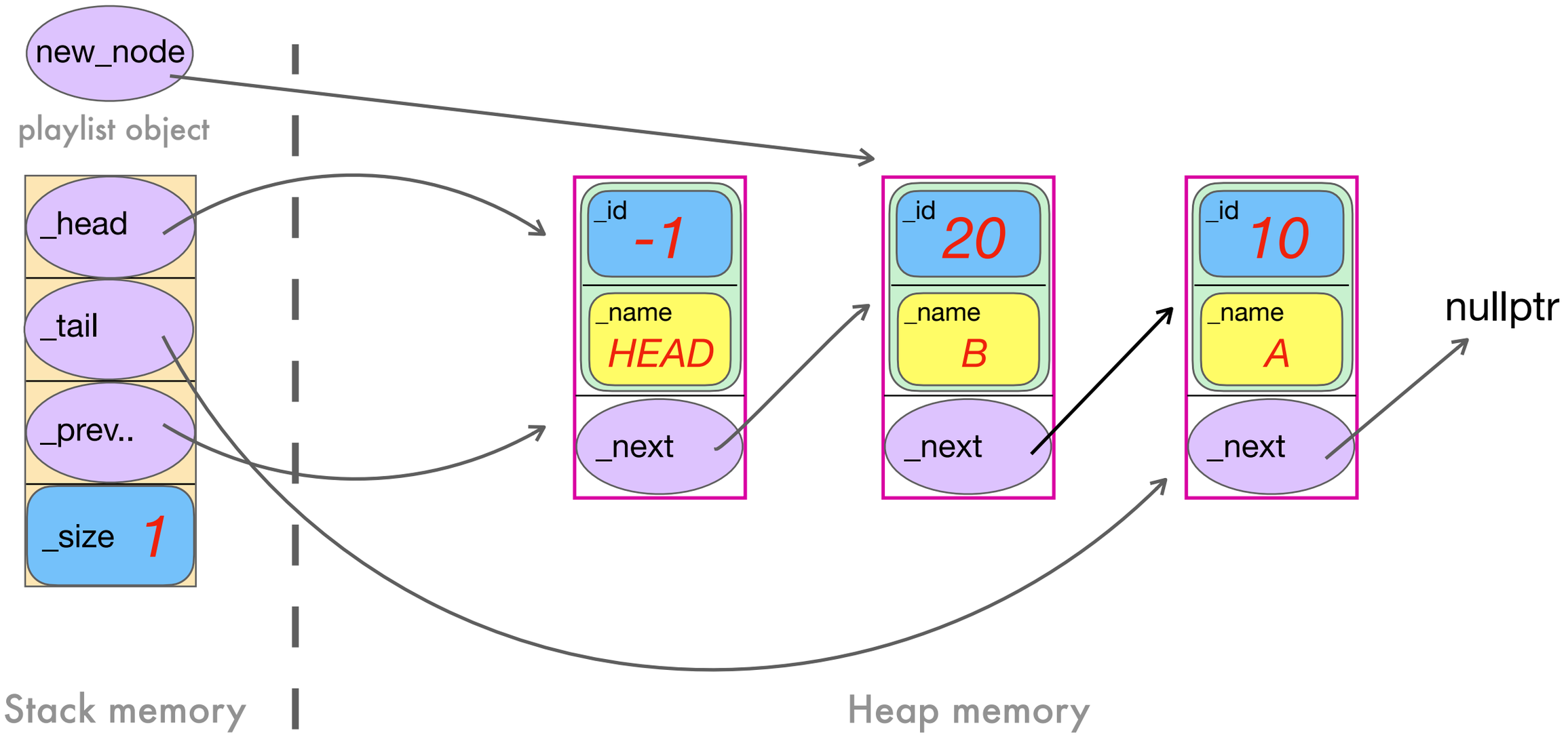

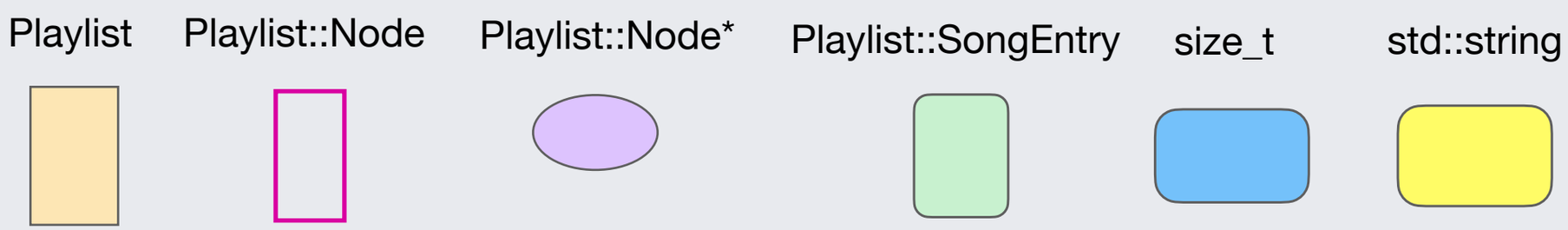

Legend

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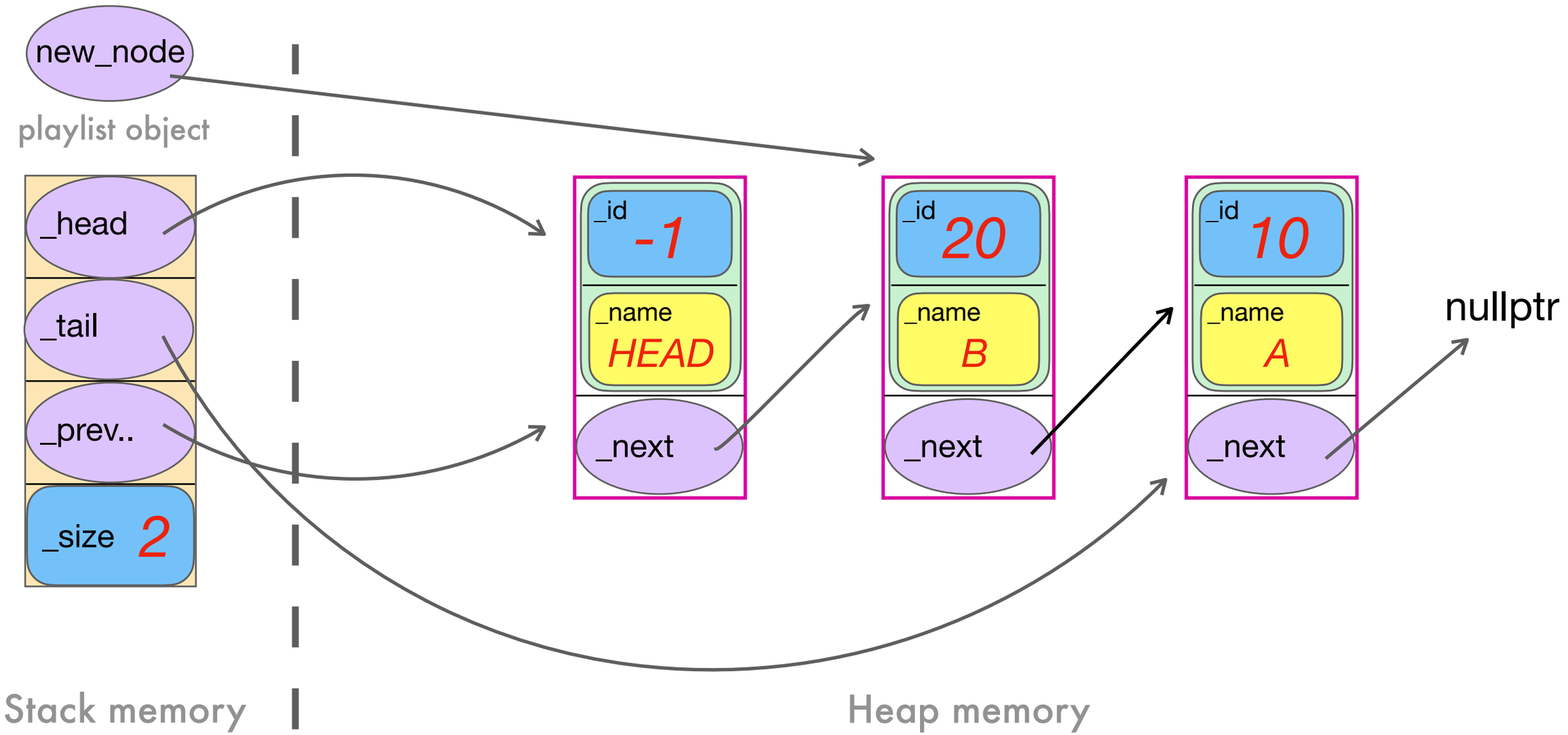
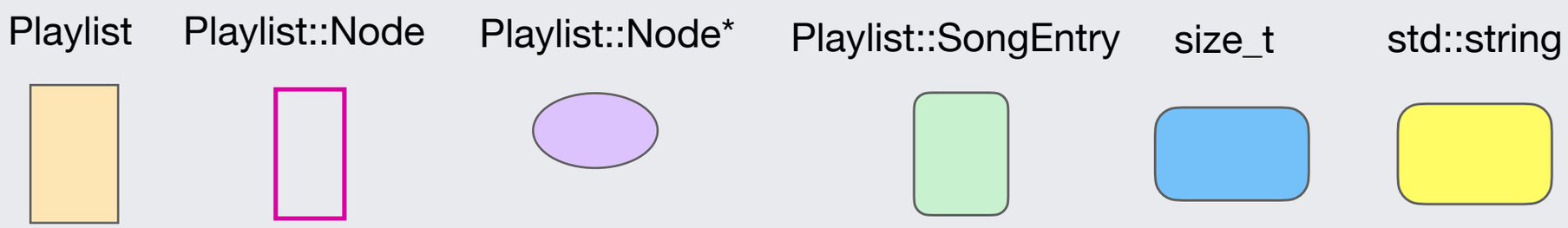
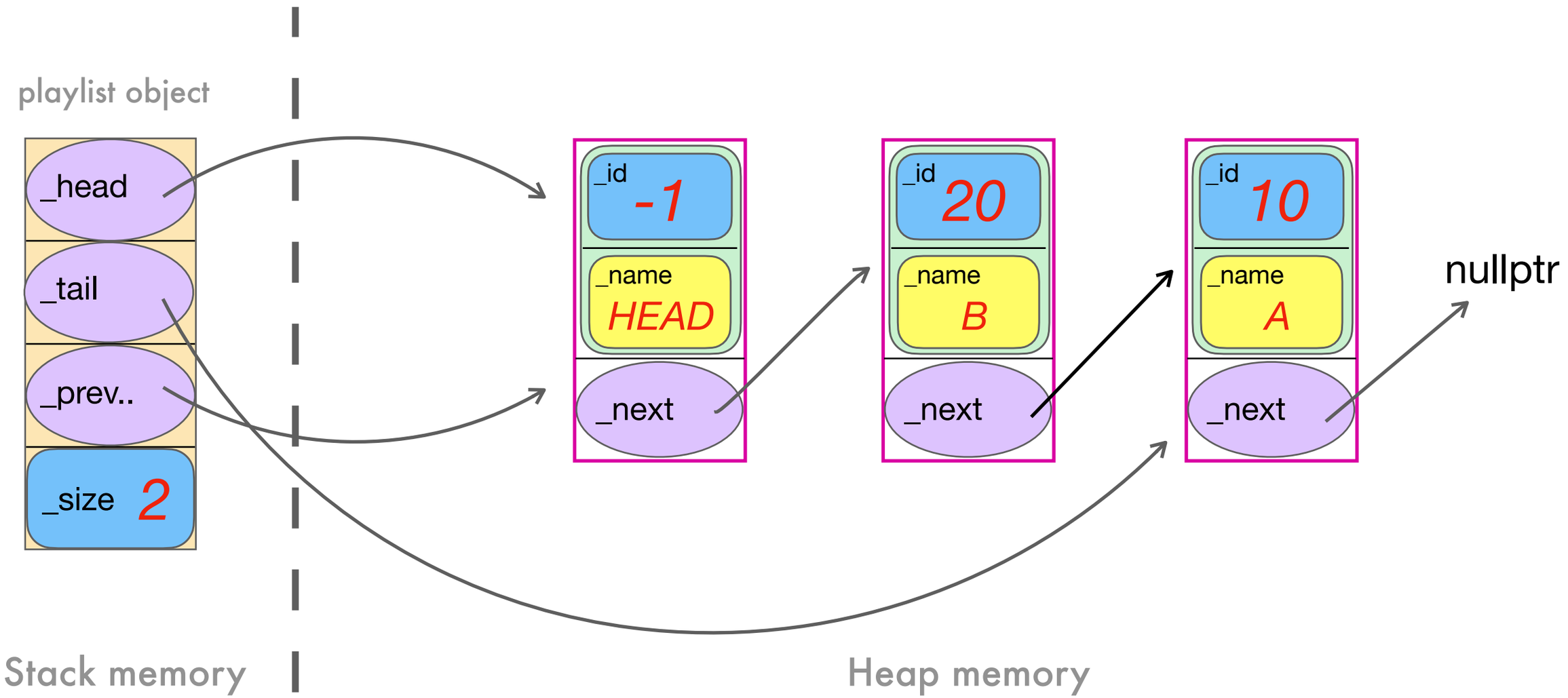


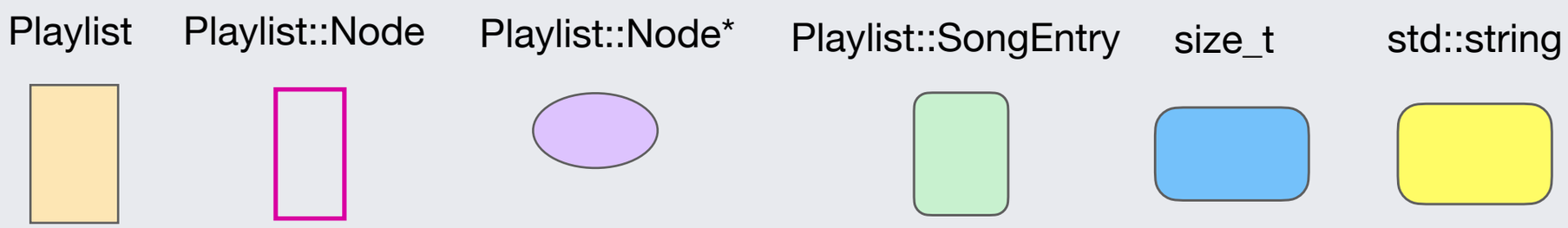


Legend

Now let's advance the cursor:

```
playlist.advance_cursor();
```





Legend

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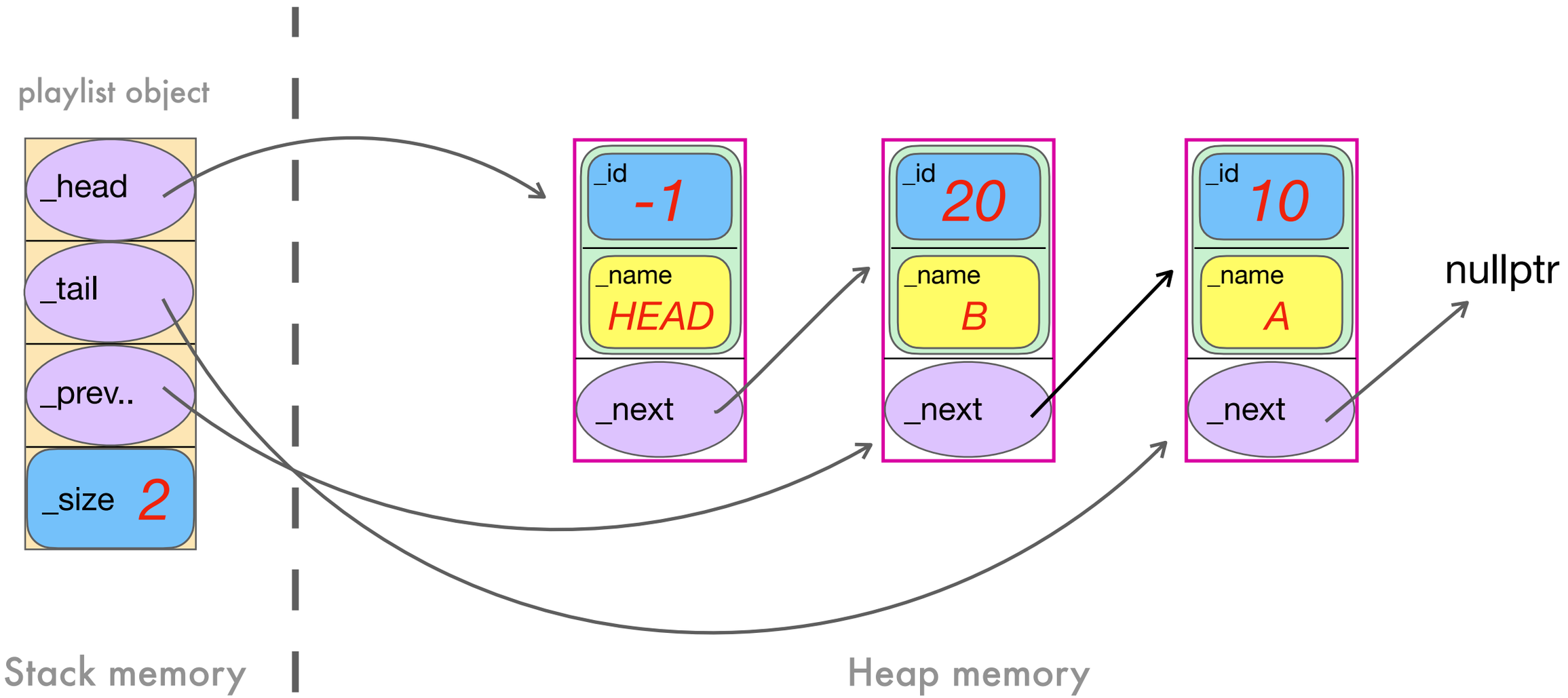
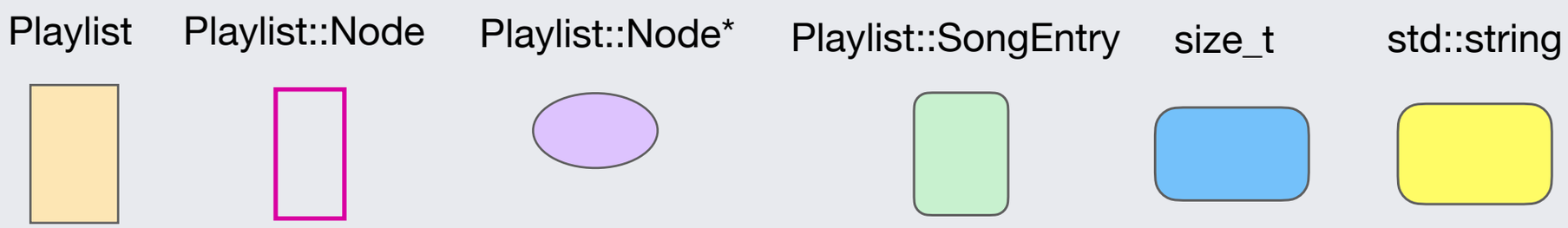
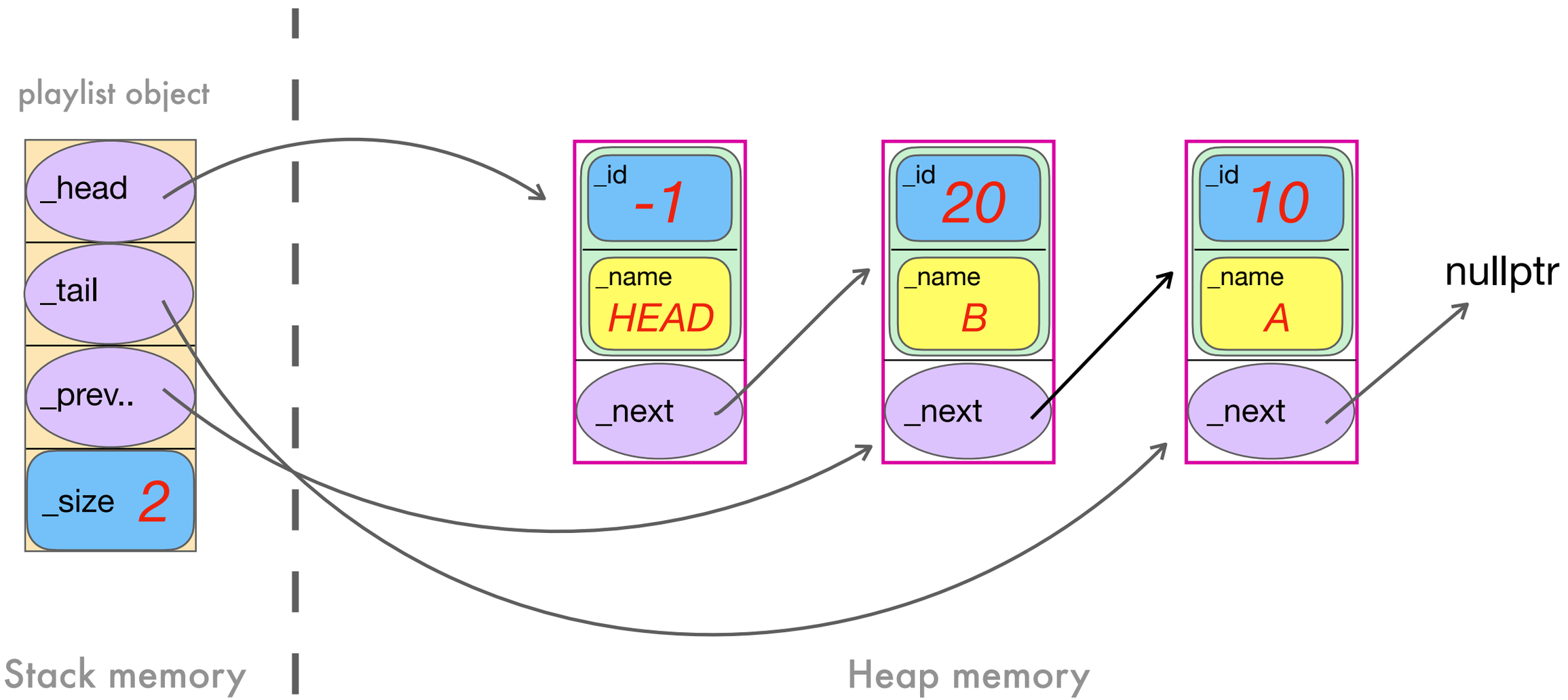
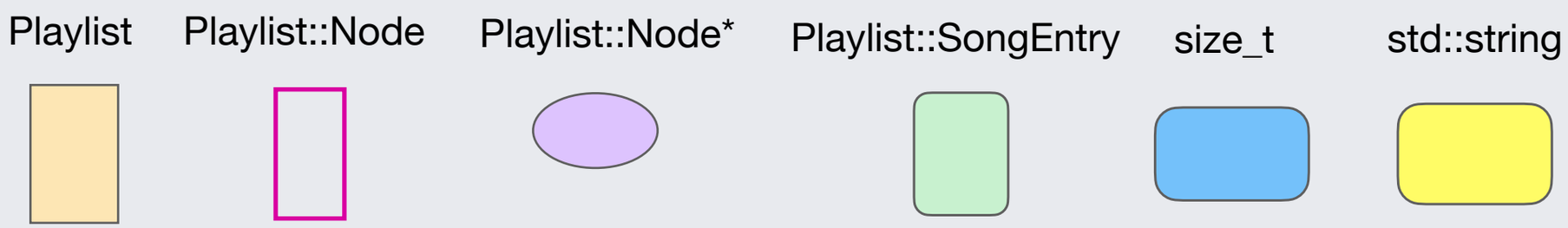




And insert once more:

```
playlist.insert_at_cursor(Playlist::SongEntry(30, “C”));
```





Legend

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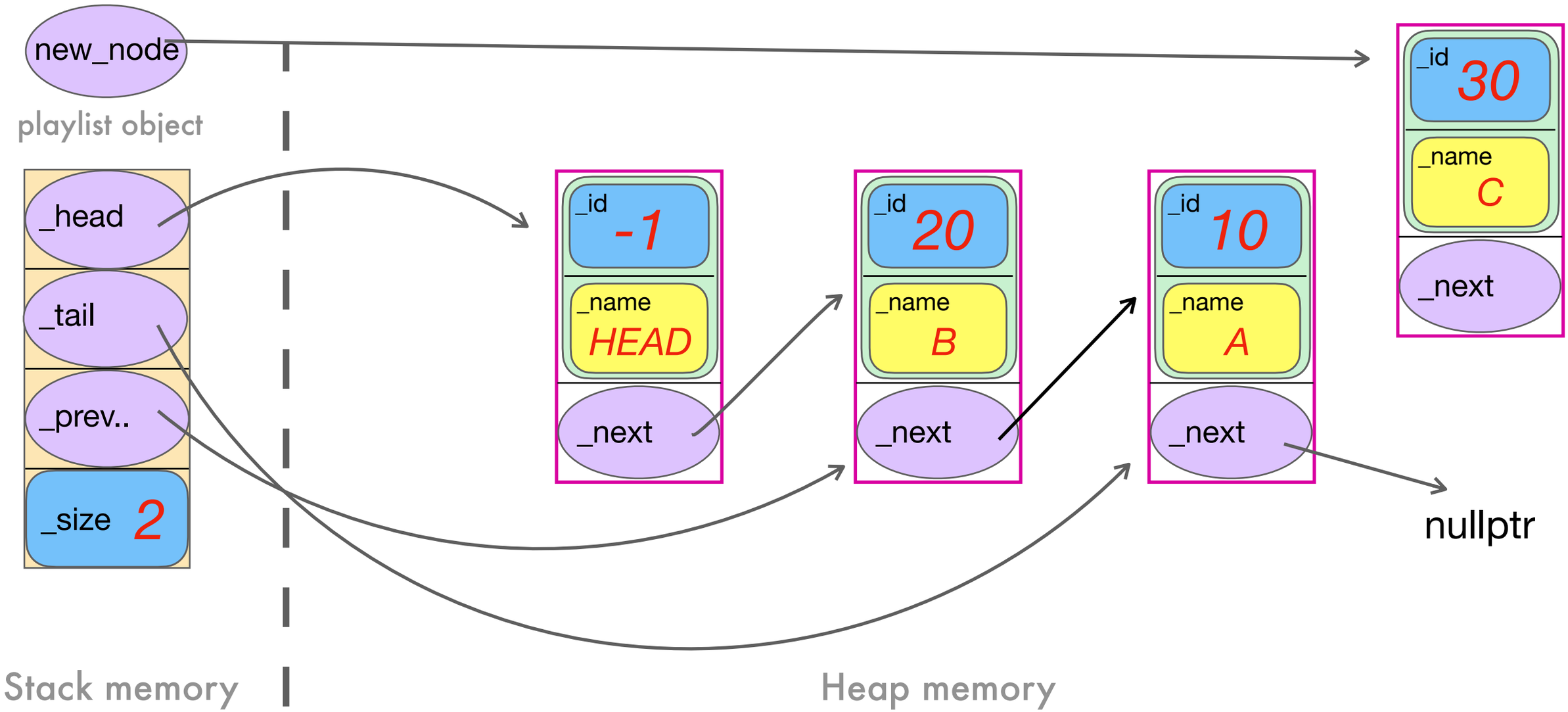
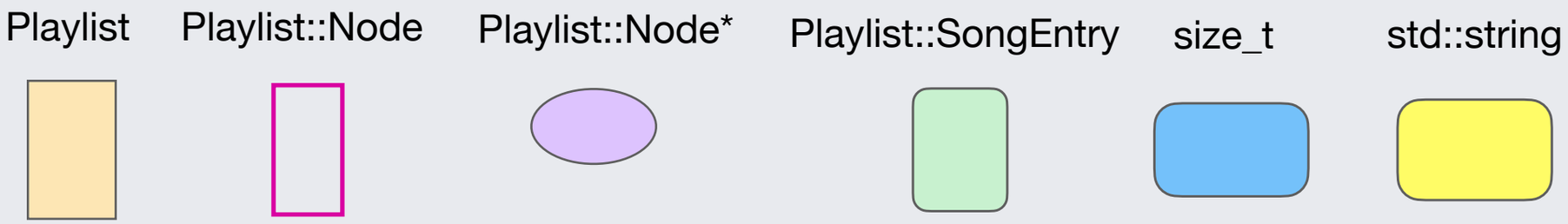
```





And insert once more:

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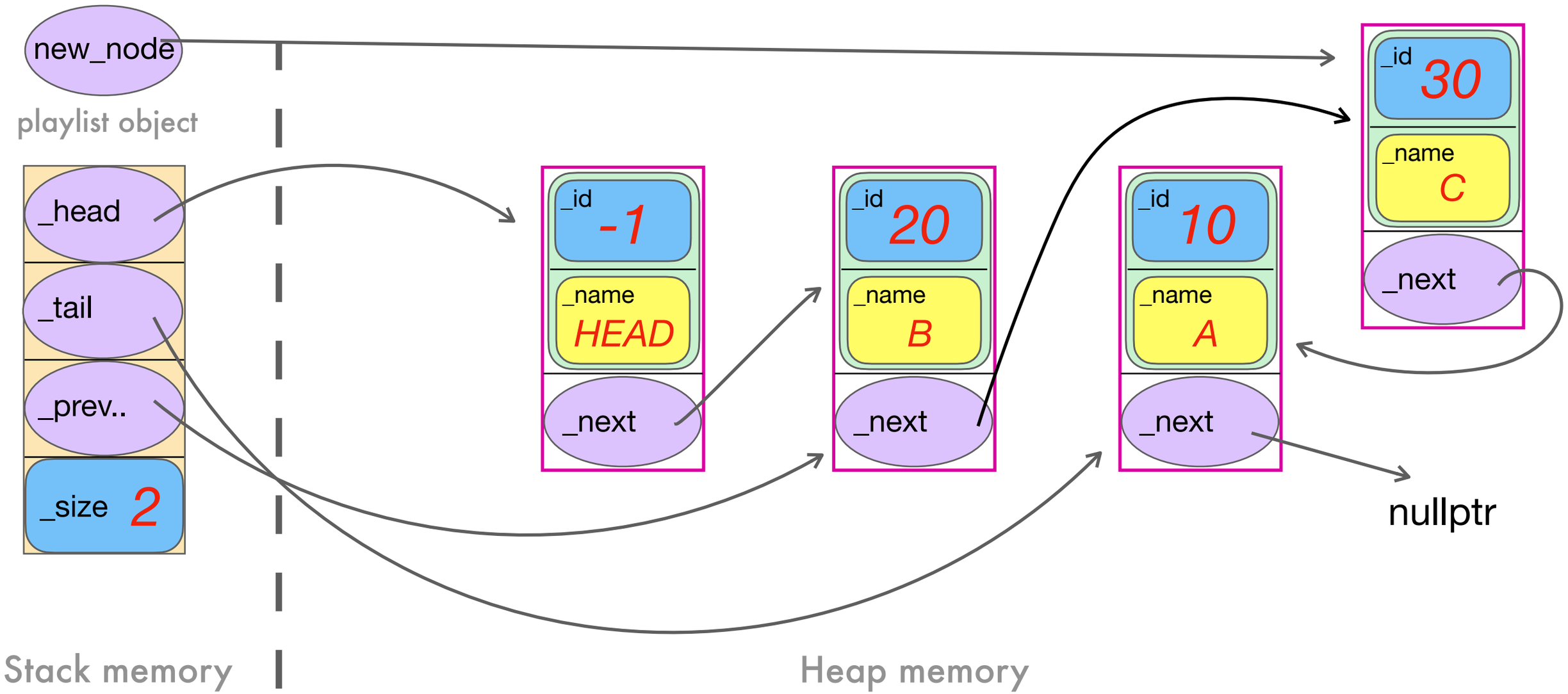
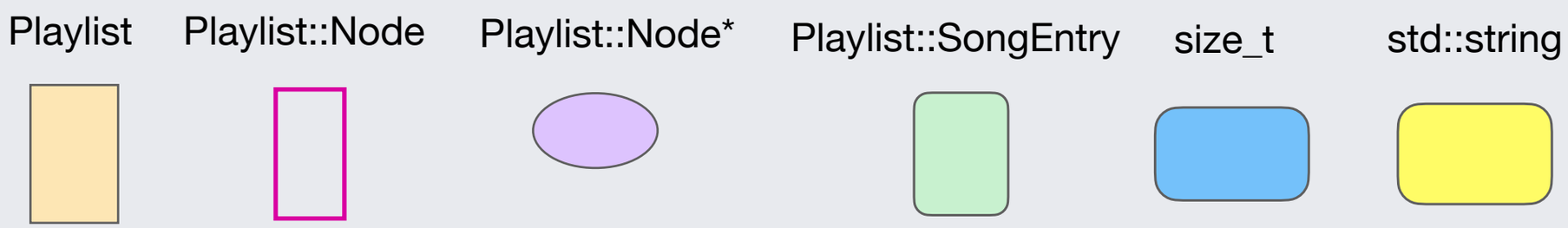
playlist.insert_at_cursor(Playlist::SongEntry(30, “C”);
```





Legend

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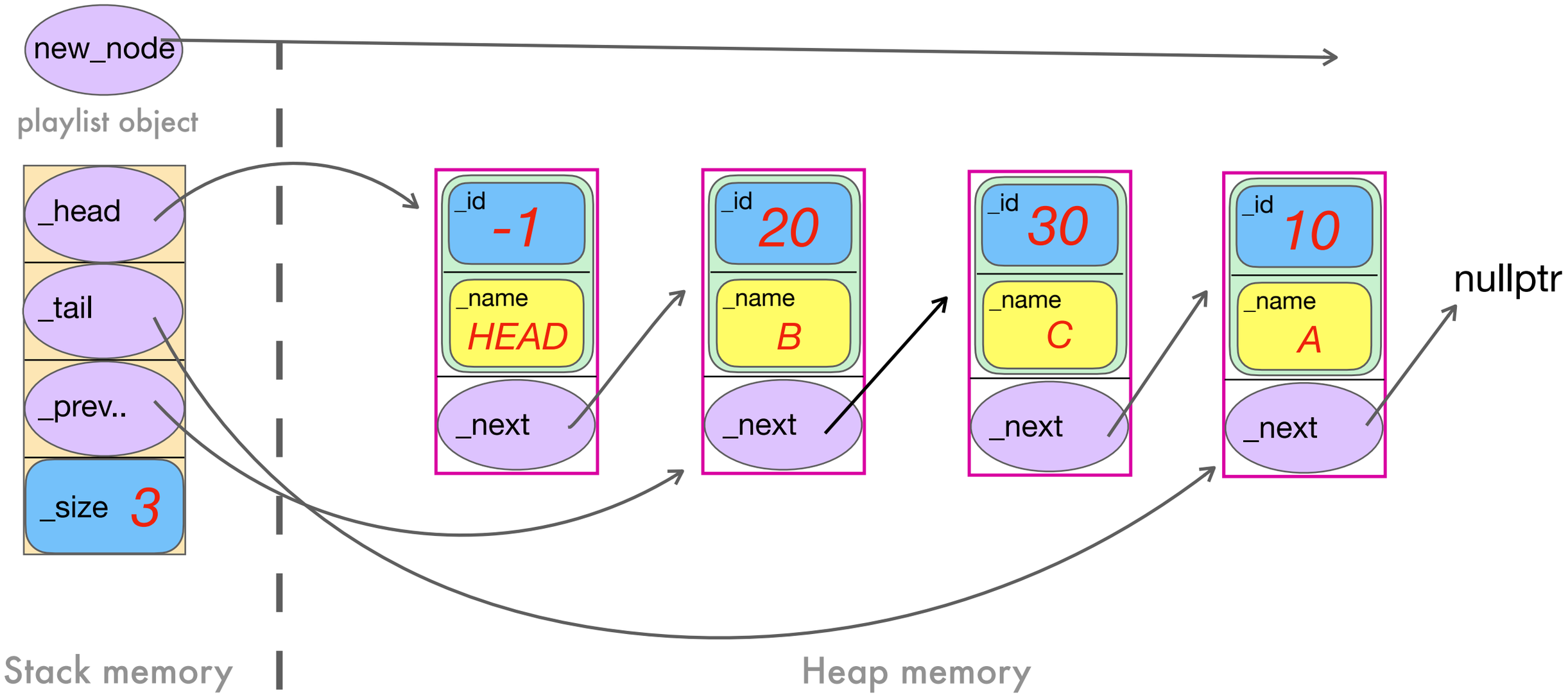
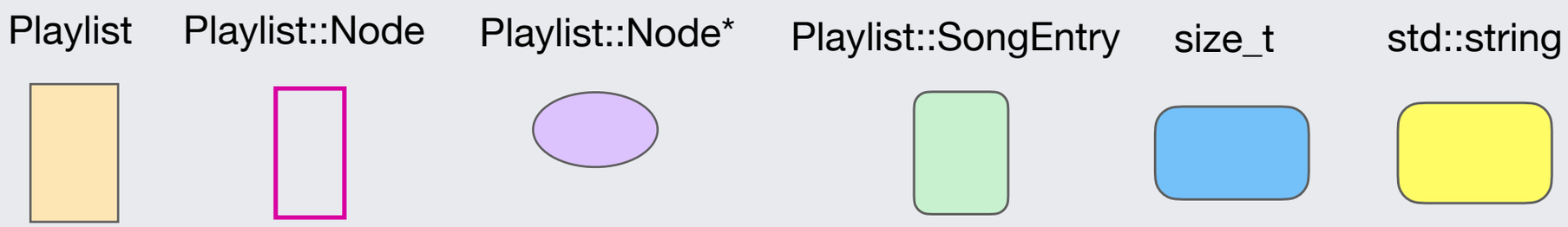
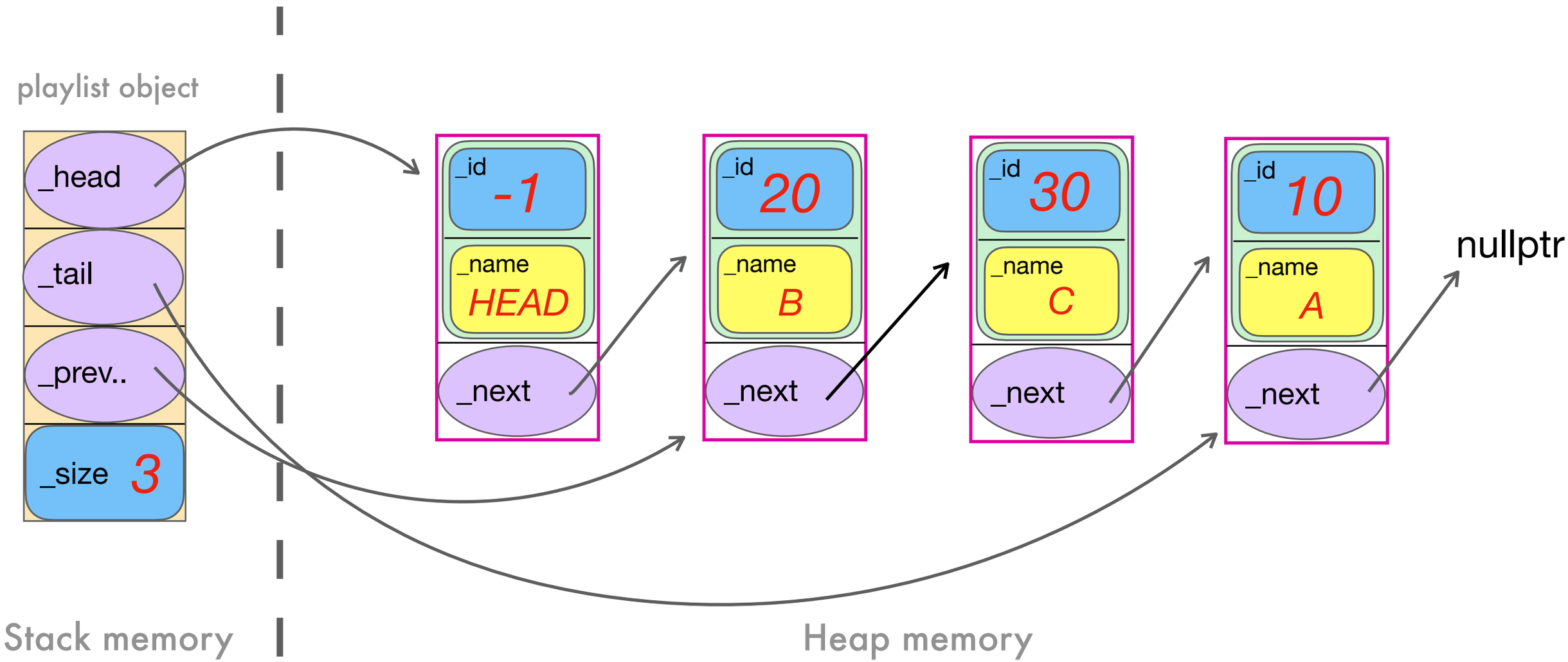
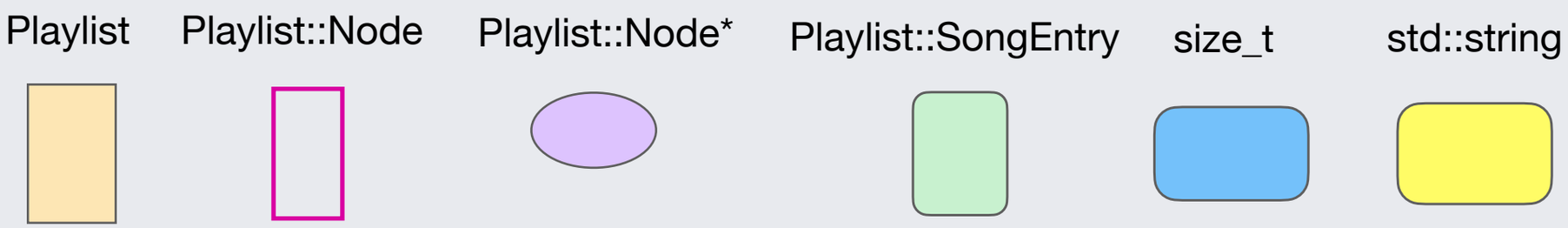
```



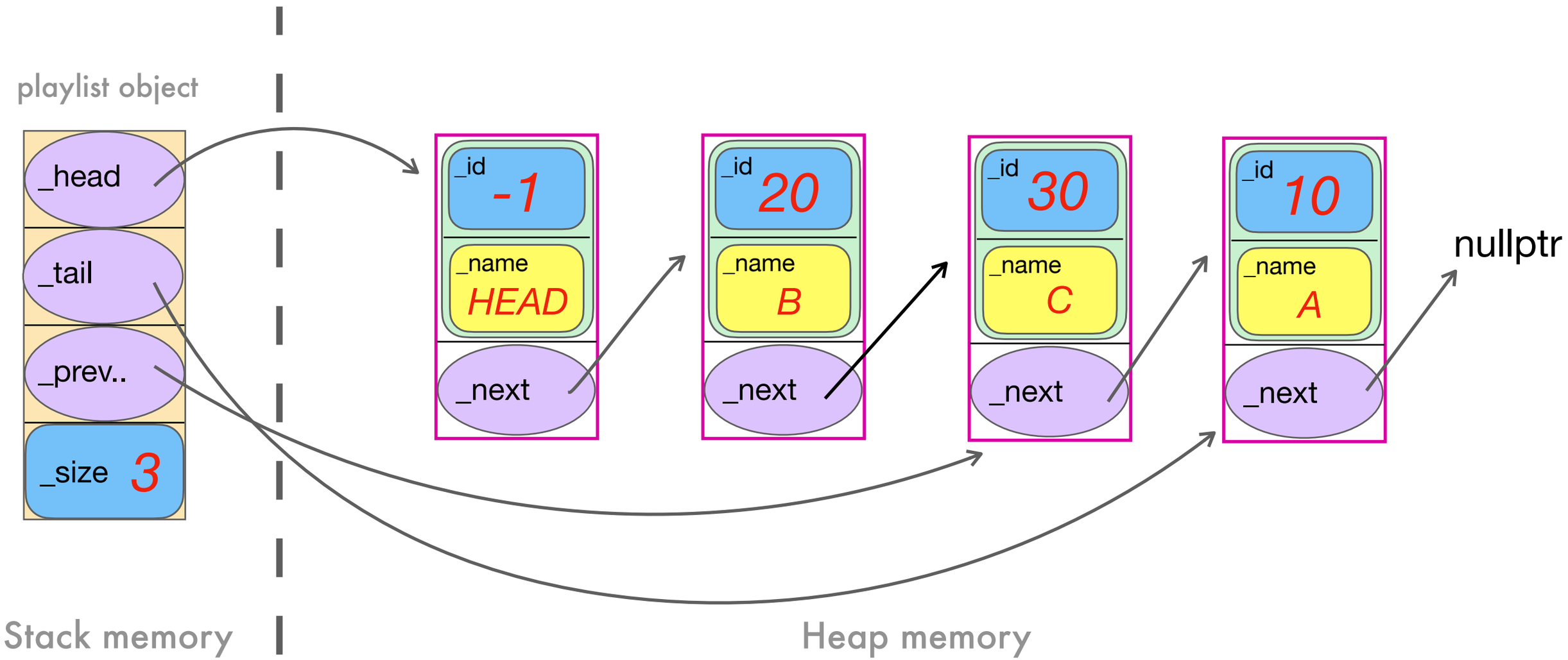


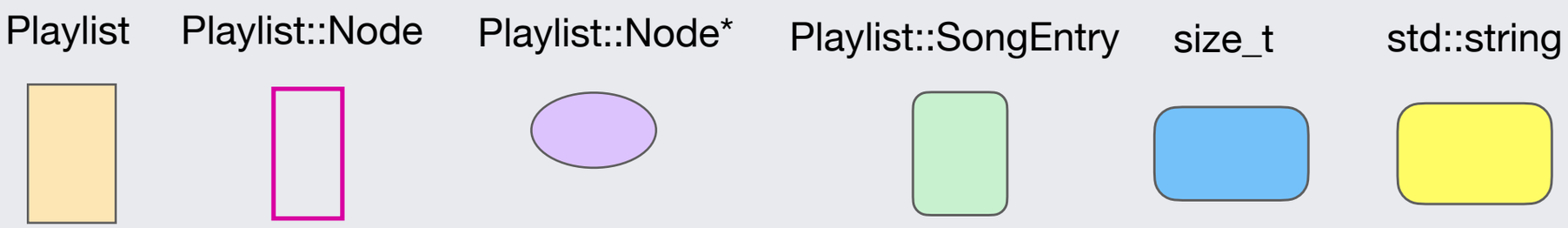
```
playlist.advance_cursor();
```



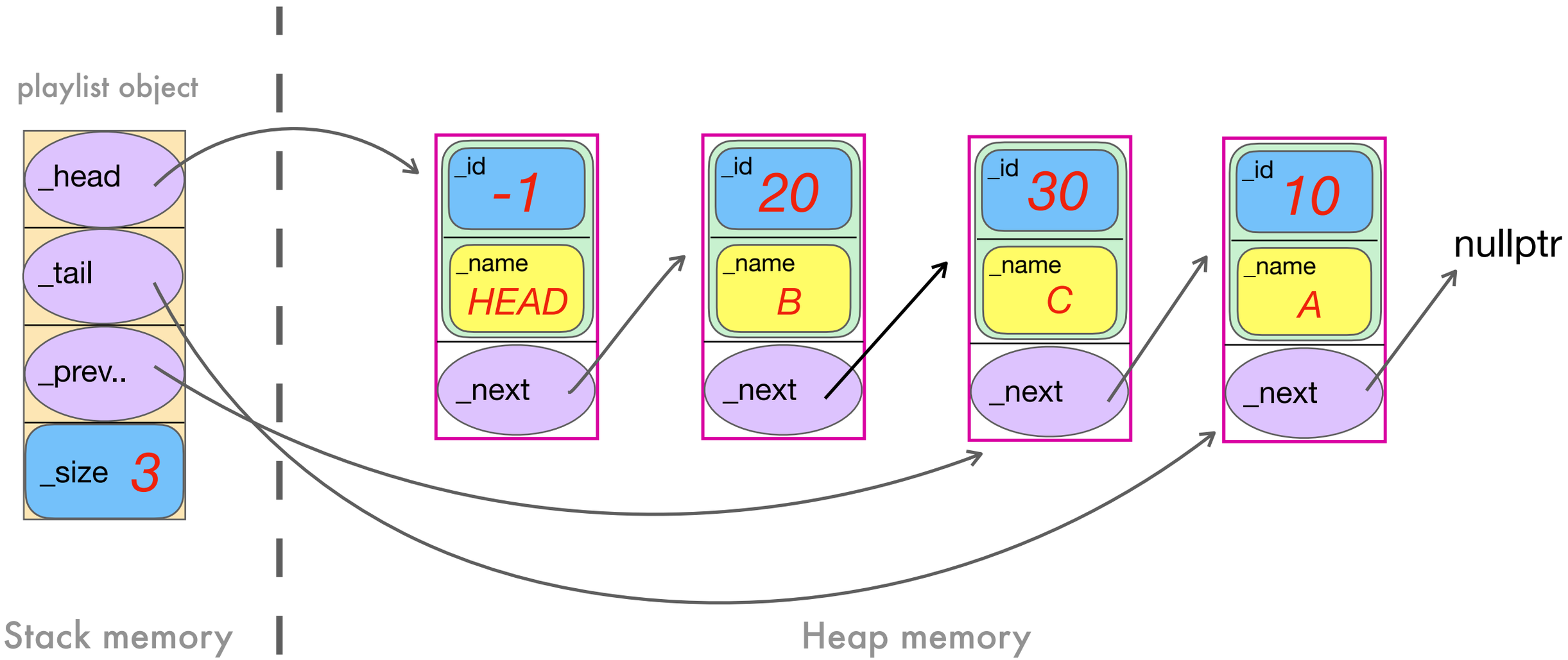


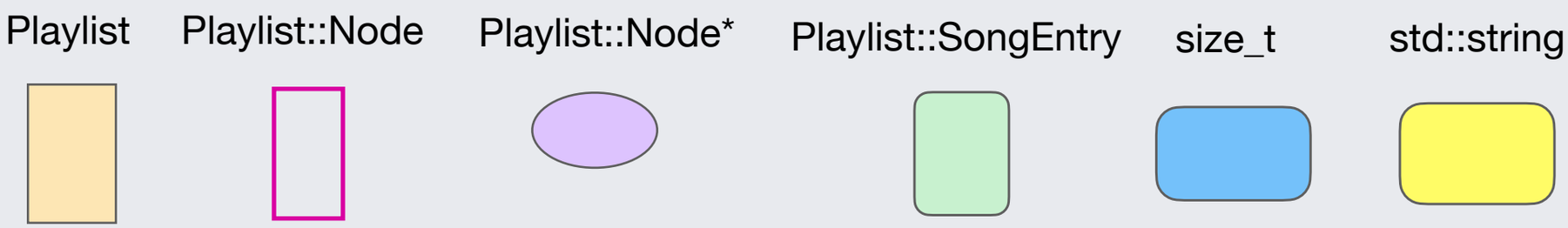
```
playlist.advance_cursor();
```



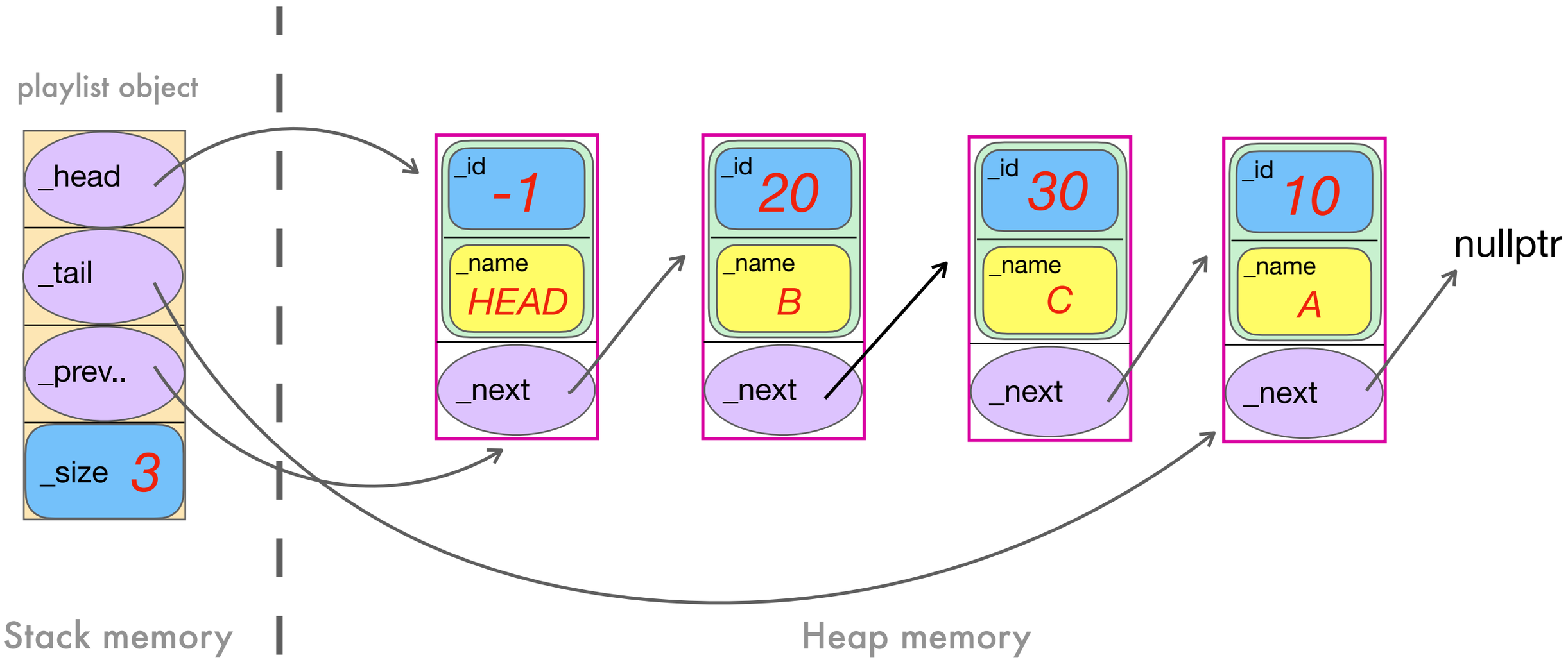


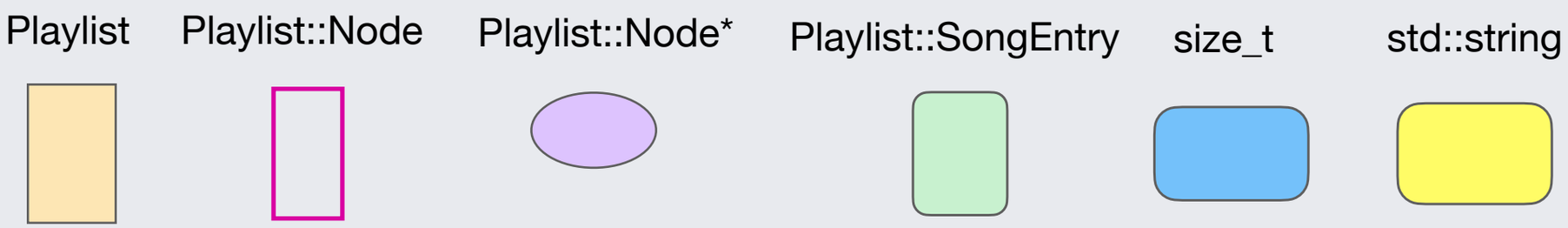
```
playlist.circular_advance_cursor();
```



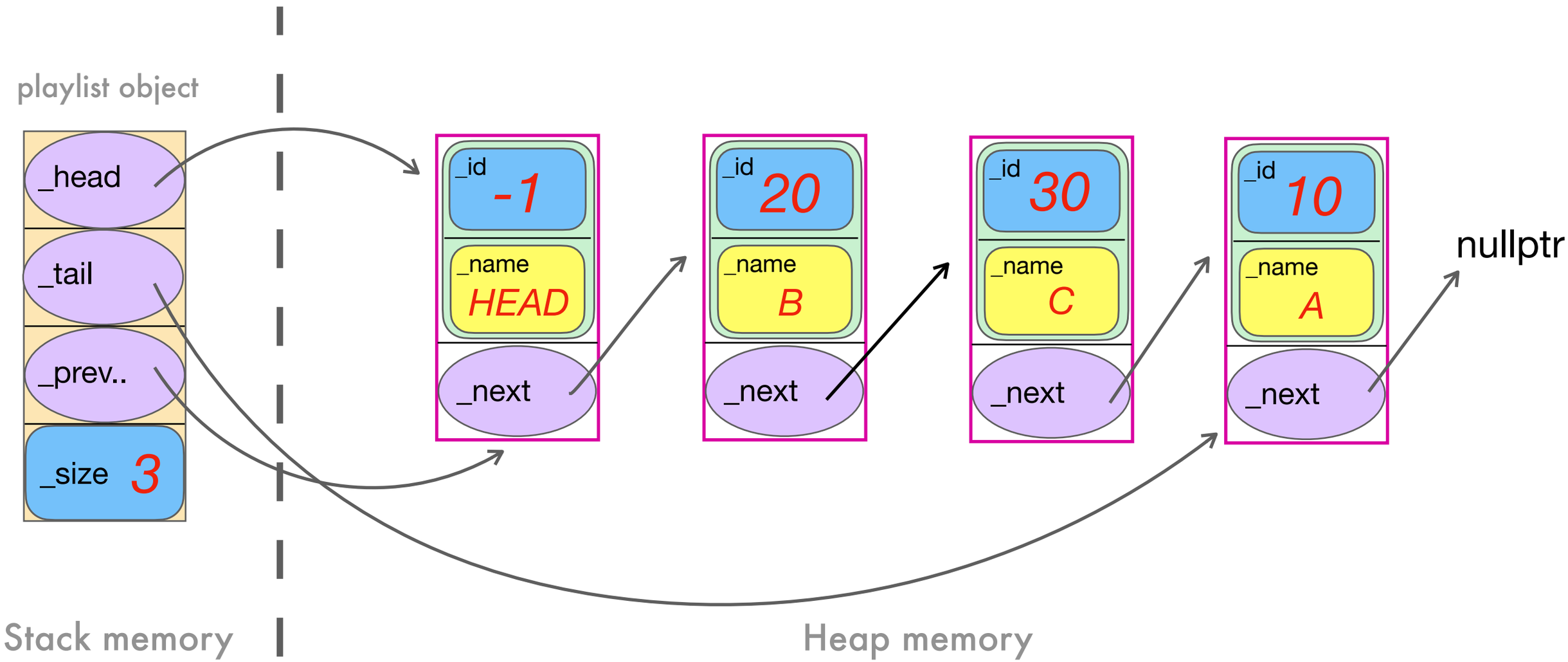


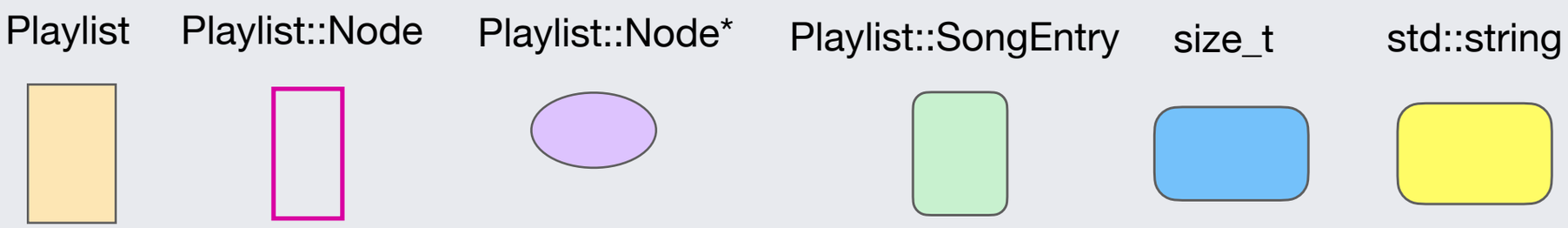
```
playlist.circular_advance_cursor();
```



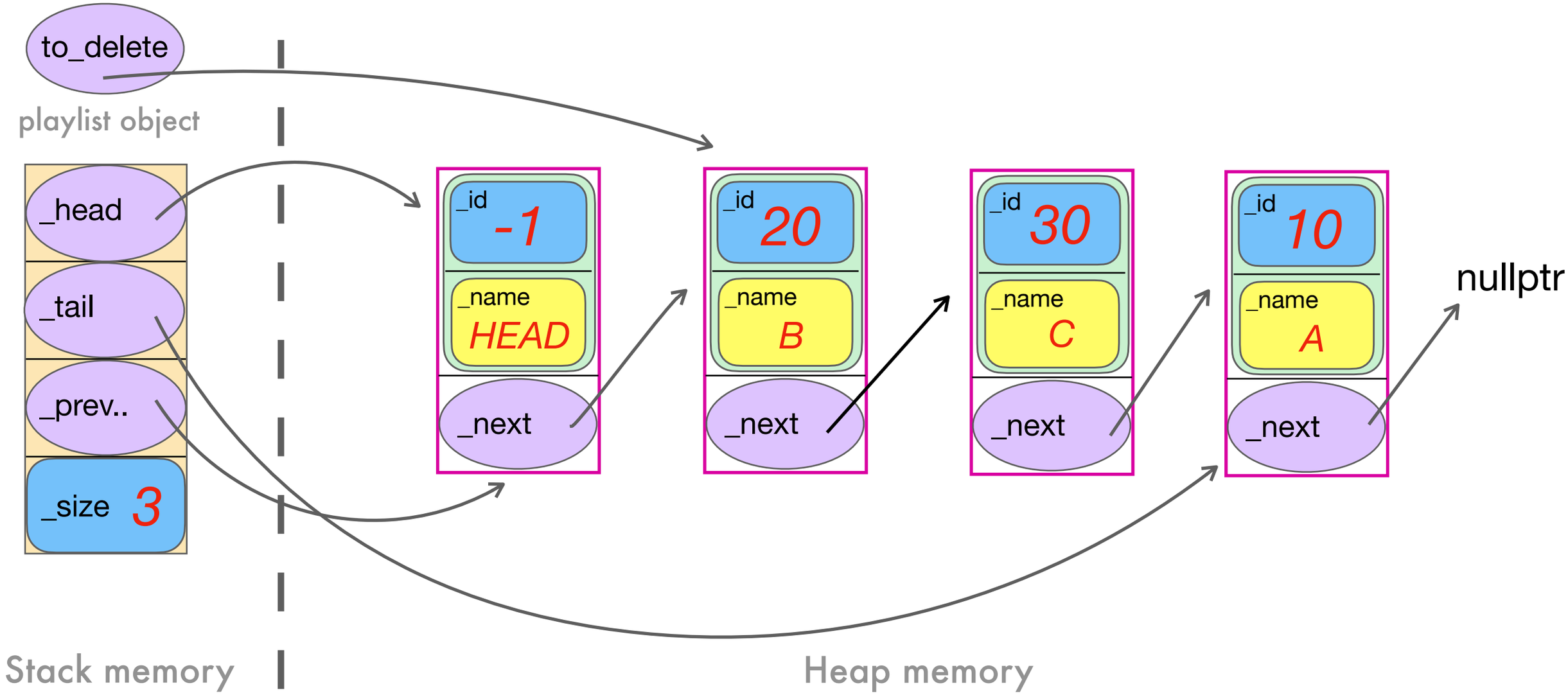


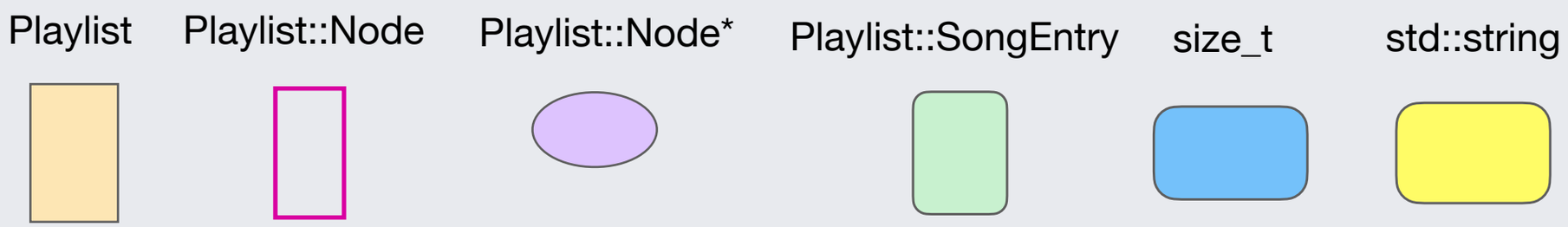
```
playlist.remove_at_cursor();
```



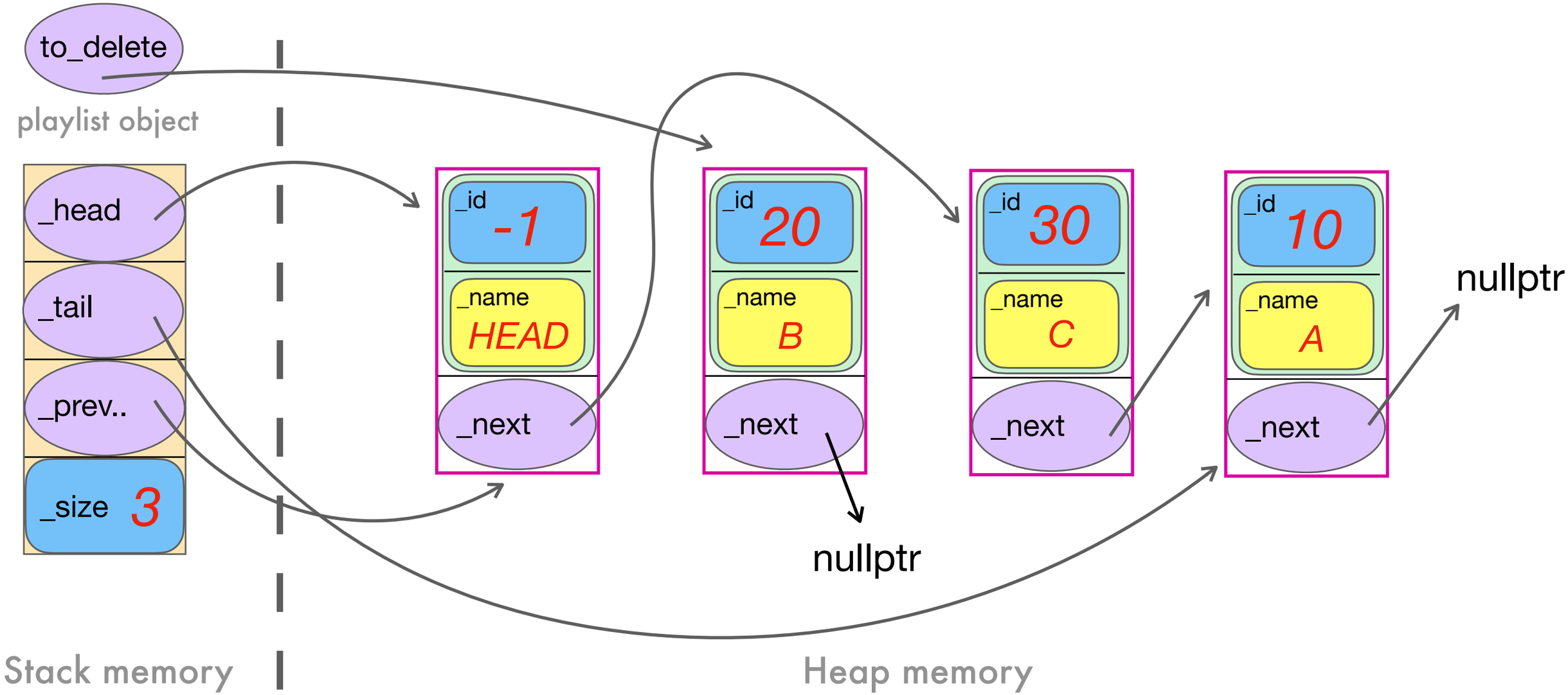


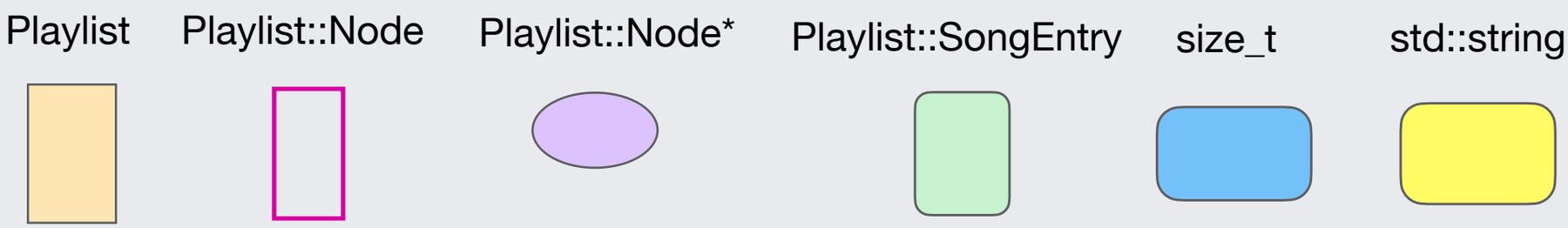
```
playlist.remove_at_cursor();
```



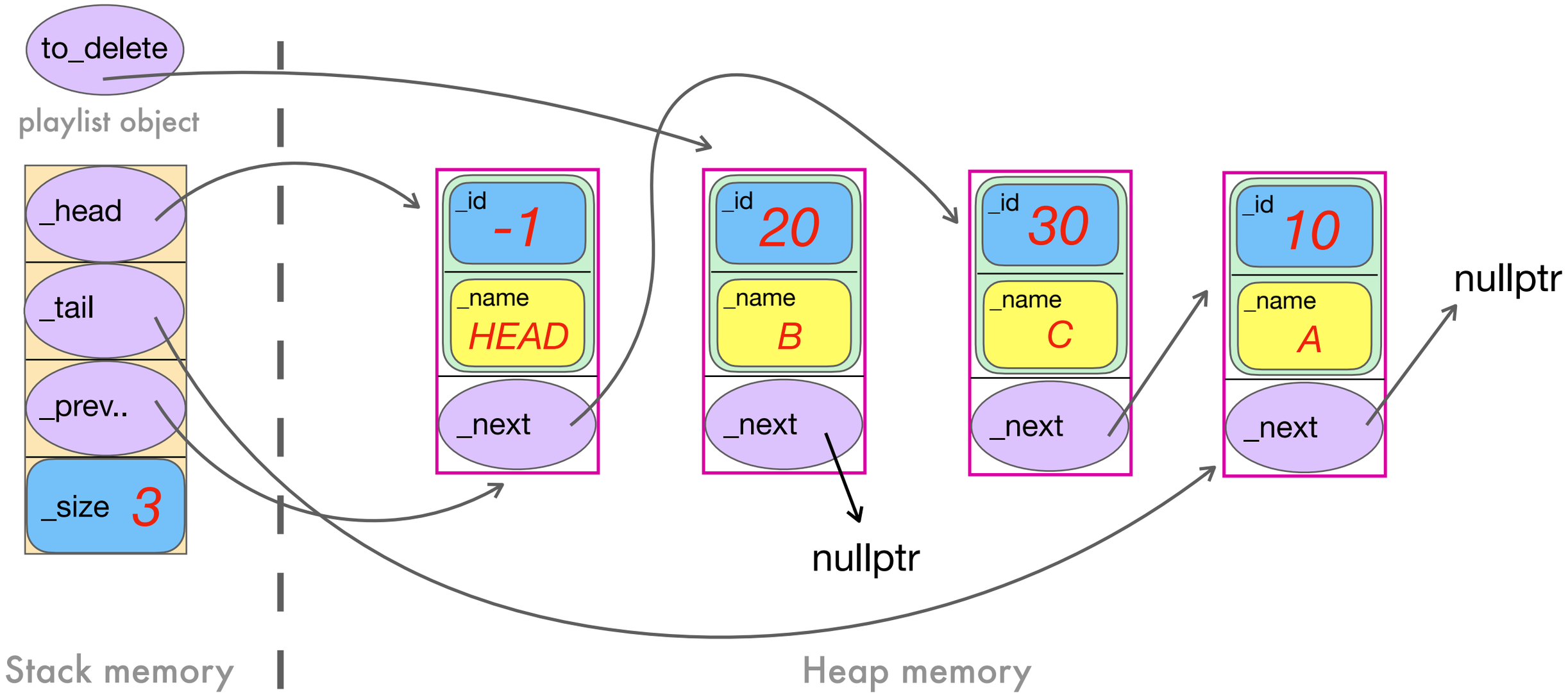


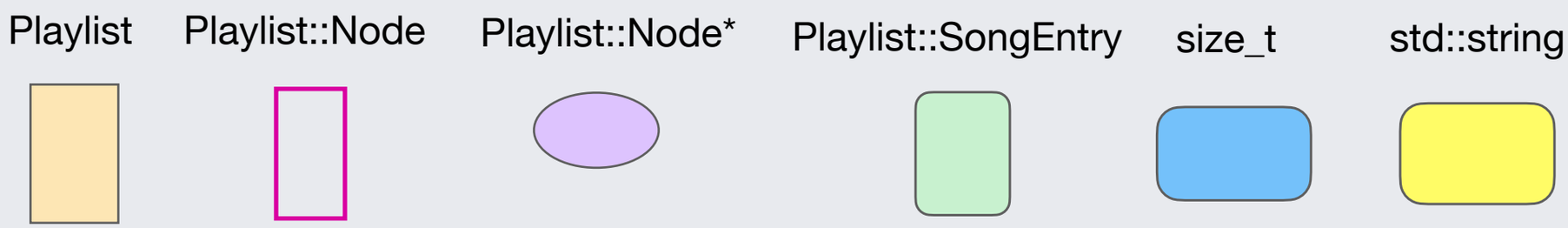
```
playlist.remove_at_cursor();
```





We have isolated the node to remove from the chain, and we can now safely deallocate that memory (**delete to_delete;**) and update _size.





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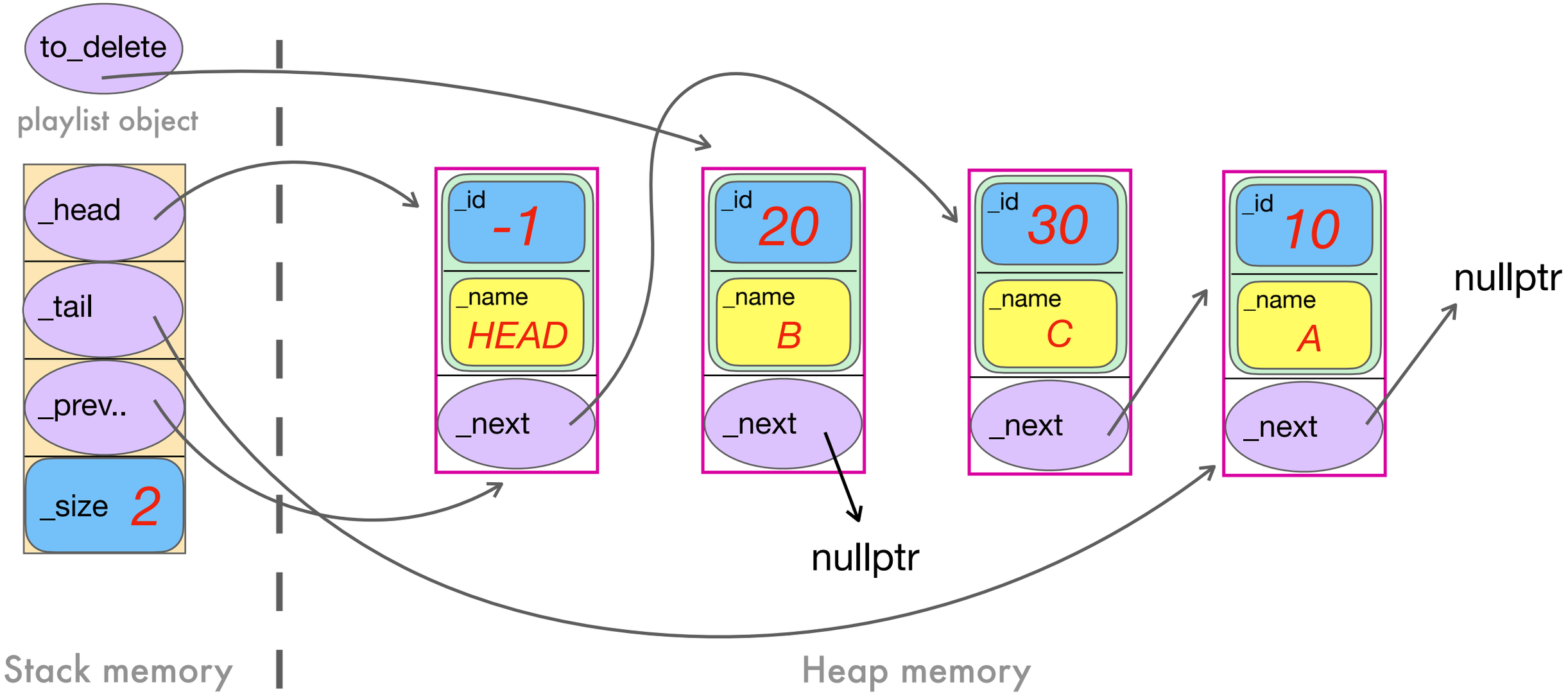
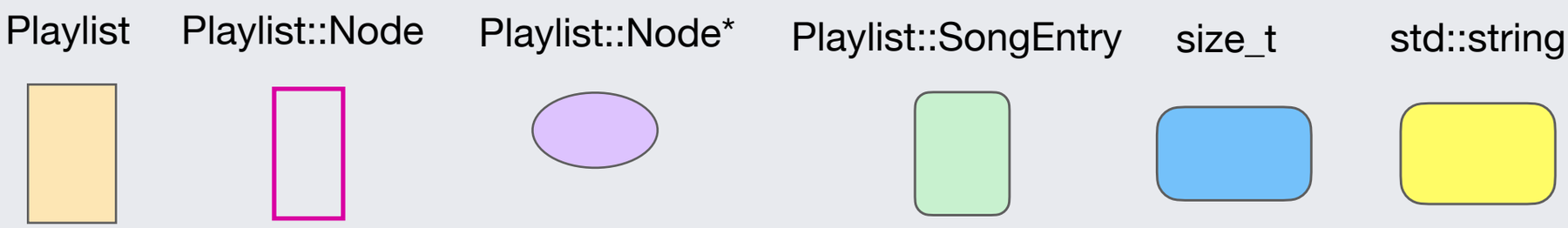
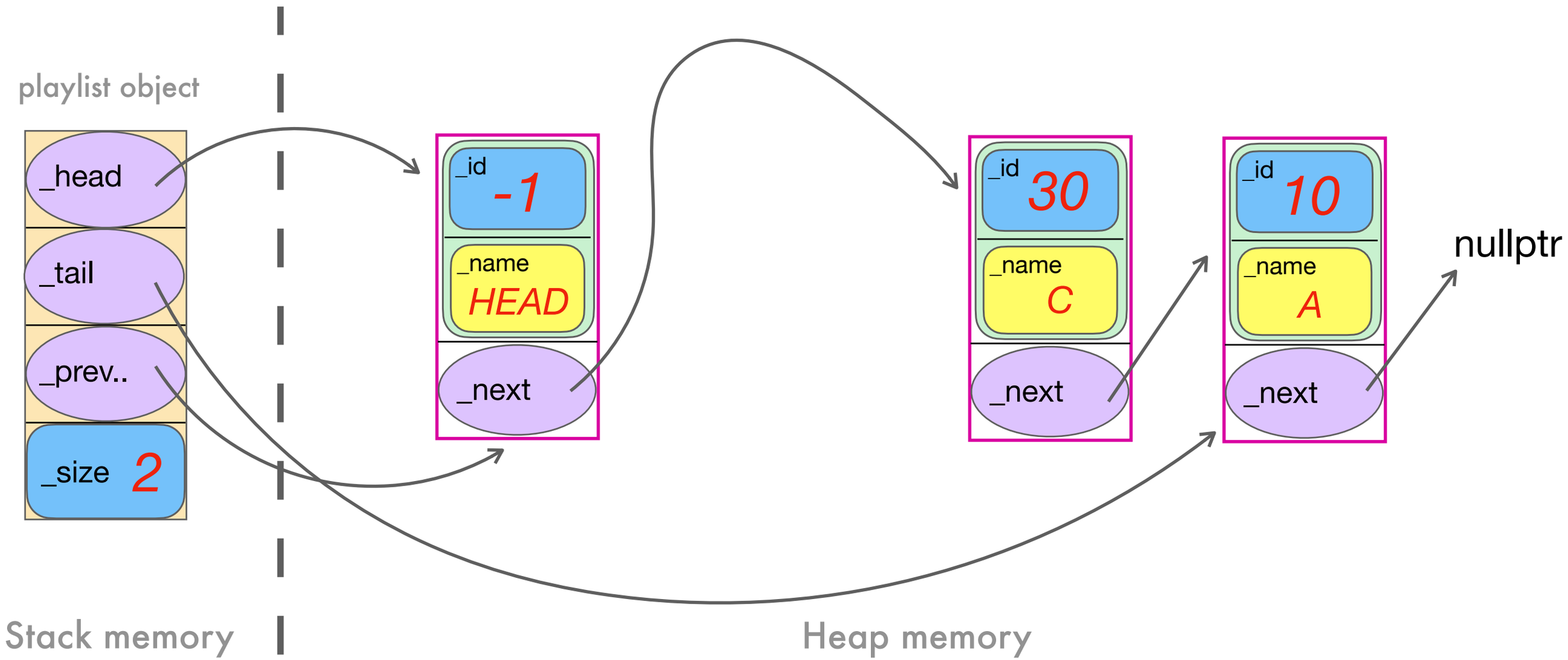
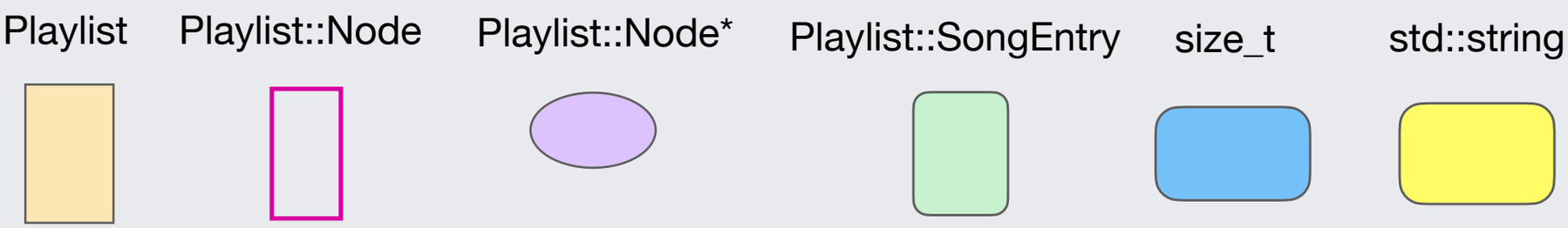




To be continued .. in your programming project 2!

Happy coding. And draw lots of pictures!





Legend