

Project 05: Circular Buffer

Covered Concepts: templated class, STL `std::array`, circular buffer with strings, ints, user-defined class

Project Requirements:

- Create a C++ project for a circular buffer.
- Refer to here for a general description: https://en.wikipedia.org/wiki/Circular_buffer
- Refer to this document for a visual representation of the operation: [P05 CircularBufferExample.pdf](#)
- The circular buffer you develop will not recognize buffer overflow but will write over the oldest data.
- Uses a templated class which employs the `std::array` from STL.
- Use only the starter files provided.
- **Further requirements are provided as comments in the starter files which will be discussed during class.**

Sample Run:

Your code should produce this output exactly including spacing and alignment.

```
***** <int> Circular Buffer Demo *****
```

Initial state

Buffer Info: head: 0, tail: 0, current: 0, capacity: 5, size: 0

Container: -858993460 -858993460 -858993460 -858993460 -858993460

Pushing 0

Buffer Info: head: 0, tail: 0, current: 1, capacity: 5, size: 1

Container: 0 -858993460 -858993460 -858993460 -858993460

Pushing 10

Buffer Info: head: 0, tail: 1, current: 2, capacity: 5, size: 2

Container: 0 10 -858993460 -858993460 -858993460

Pushing 20

Buffer Info: head: 0, tail: 2, current: 3, capacity: 5, size: 3

Container: 0 10 20 -858993460 -858993460

Pushing 30

Buffer Info: head: 0, tail: 3, current: 4, capacity: 5, size: 4

Container: 0 10 20 30 -858993460

Pushing 40

Buffer Info: head: 0, tail: 4, current: 0, capacity: 5, size: 5

Container: 0 10 20 30 40

Pushing 50

Buffer Info: head: 1, tail: 0, current: 1, capacity: 5, size: 5

Container: 50 10 20 30 40

Pushing 60

Buffer Info: head: 2, tail: 1, current: 2, capacity: 5, size: 5

Container: 50 60 20 30 40

Pushing 70

Buffer Info: head: 3, tail: 2, current: 3, capacity: 5, size: 5

Container: 50 60 70 30 40

Popping: 30

Buffer Info: head: 4, tail: 2, current: 3, capacity: 5, size: 4

Container: 50 60 70 30 40

Popping: 40

Buffer Info: head: 0, tail: 2, current: 3, capacity: 5, size: 3

Container: 50 60 70 30 40

Popping: 50

Buffer Info: head: 1, tail: 2, current: 3, capacity: 5, size: 2

Container: 50 60 70 30 40

Popping: 60

Buffer Info: head: 2, tail: 2, current: 3, capacity: 5, size: 1

Container: 50 60 70 30 40

Popping: 70

Buffer Info: head: 3, tail: 2, current: 3, capacity: 5, size: 0

Container: 50 60 70 30 40

***** <string> Circular Buffer Demo *****

Initial state

Buffer Info: head: 0, tail: 0, current: 0, capacity: 5, size: 0

Container:

After using back_insert_iterator

Buffer Info: head: 2, tail: 1, current: 2, capacity: 5, size: 5

Container: of oz the wonderful world

Popping: the

Buffer Info: head: 3, tail: 1, current: 2, capacity: 5, size: 4

Container: of oz the wonderful world

Popping: wonderful

Buffer Info: head: 4, tail: 1, current: 2, capacity: 5, size: 3

Container: of oz the wonderful world

Popping: world

Buffer Info: head: 0, tail: 1, current: 2, capacity: 5, size: 2

Container: of oz the wonderful world

Popping: of

Buffer Info: head: 1, tail: 1, current: 2, capacity: 5, size: 1

Container: of oz the wonderful world

Popping: oz

Buffer Info: head: 2, tail: 1, current: 2, capacity: 5, size: 0

Container: of oz the wonderful world

***** <Dog> Circular Buffer Demo *****

Buffer Info: head: 0, tail: 4, current: 0, capacity: 5, size: 5

Container:

Guinness, Wheaten, 9

Grimlock, Lab, 2

Optimus, Bulldog, 5

Murphy, Lab, 14

Floyd, Beagle, 12

dogs Full?: true

Buffer Info: head: 1, tail: 0, current: 1, capacity: 5, size: 5

Container:

Snoopy, Beagle, 100

Grimlock, Lab, 2

Optimus, Bulldog, 5

Murphy, Lab, 14

Floyd, Beagle, 12

Buffer Info: head: 2, tail: 1, current: 2, capacity: 5, size: 5

Container:

Snoopy, Beagle, 100

Archie, Brittany, 1

Optimus, Bulldog, 5

Murphy, Lab, 14

Floyd, Beagle, 12

Buffer Info: head: 3, tail: 2, current: 3, capacity: 5, size: 5

Container:

Snoopy, Beagle, 100

Archie, Brittany, 1

Penny, Beagle, 2

Murphy, Lab, 14

Floyd, Beagle, 12

Popping:

Murphy, Lab, 14

Buffer Info: head: 4, tail: 2, current: 3, capacity: 5, size: 4

Container:

Snoopy, Beagle, 100

Archie, Brittany, 1

Penny, Beagle, 2

Murphy, Lab, 14

Floyd, Beagle, 12

Popping:

Floyd, Beagle, 12

Buffer Info: head: 0, tail: 2, current: 3, capacity: 5, size: 3

Container:

Snoopy, Beagle, 100

Archie, Brittany, 1

Penny, Beagle, 2

Murphy, Lab, 14

Floyd, Beagle, 12

Popping:

Snoopy, Beagle, 100

Buffer Info: head: 1, tail: 2, current: 3, capacity: 5, size: 2

Container:

Snoopy, Beagle, 100

Archie, Brittany, 1

Penny, Beagle, 2

Murphy, Lab, 14

Floyd, Beagle, 12

Popping:

Archie, Brittany, 1

Buffer Info: head: 2, tail: 2, current: 3, capacity: 5, size: 1

Container:

Snoopy, Beagle, 100

Archie, Brittany, 1

Penny, Beagle, 2

Murphy, Lab, 14

Floyd, Beagle, 12

Popping:

Penny, Beagle, 2

Buffer Info: head: 3, tail: 2, current: 3, capacity: 5, size: 0

Container:

Snoopy, Beagle, 100

Archie, Brittany, 1

Penny, Beagle, 2

Murphy, Lab, 14

Floyd, Beagle, 12