Project Pitch for Mr. Keogh

Pitch by Quickship Inc.

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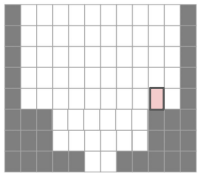
Our Basic Understanding: Part 1/9 (Load/Unload)

- You want a system that tells the operator the fastest way to load/unload a specific set of containers for a ship with an order of operations and simple animation [a,24]
- The system should read the manifest, ask the operator containers to be unloaded, and what containers to load [a,27]
- The system should ask which containers are being unloaded before asking how many containers are being loaded (a,18)
- The system should ask the user how many containers to load before asking for the weight of each container [d,line 6]
- The system should only allow the user to enter 0 to 96 containers for loading [d, line 6]
    - More accurately, the system should allow the user to enter 0 to (# empty spaces + # of containers to unload) [d,line 8]
- The system should only allow containers to be loaded into empty spaces on the ship that are either on row 1, have a container directly below them, or have a NAN cell directly below them [a,18]
- The system will show a reminder to the operator to send the manifest back to the captain [b]



Our Basic Understanding: Part 2/9 (Manifest)

- The system should identify a file as the manifest if the file is a text file [a,35]
- The system should append OUTBOUND to the manifest file's name [a,35]
- The system should edit the manifest after the operator moves a container from one spot in the ship to another [a,21]

Our Basic Understanding: Part 3/9 (Containers)

- The system should prompt the user for the weight and name of containers being loaded onto the ship [a,20]

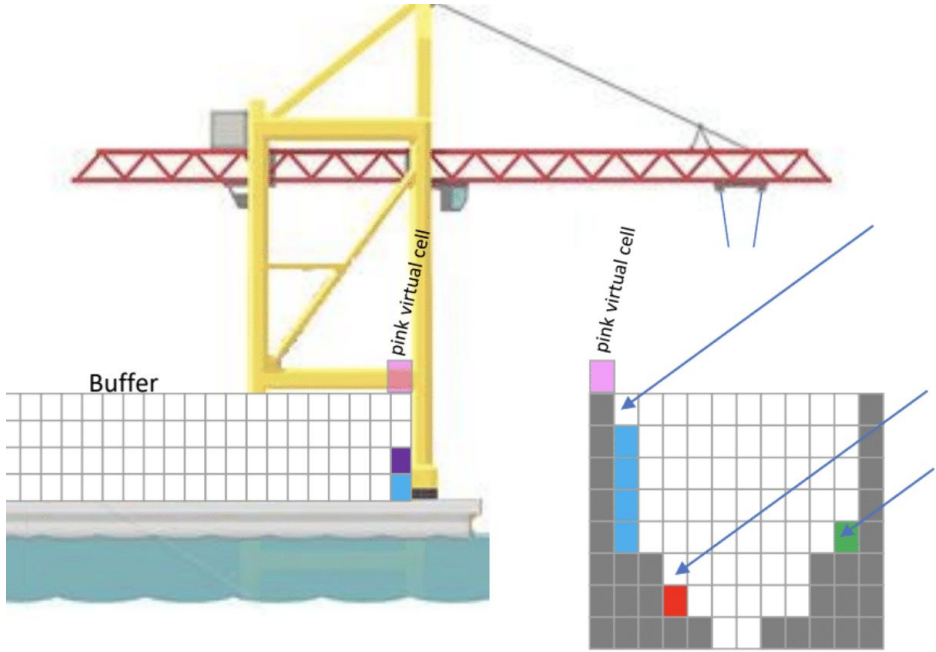
- The system should allow the user to name containers up to 255 ASCII characters
  - ASCII characters allowed include lower case letters, upper case letters, special characters, and numbers [b]

- The system must ensure the name the user enters: [b]
  1) Has at least 1 printable character
  2) Cannot start with space
  3) Cannot be NAN or UNUSED

- The system should only allow the user to enter weights between 0 and 99,999 kilos [b]

Our Basic Understanding: Part 4/9 (Time Calculation)

- The system provides a time estimate for how long the operations list will take to execute [a,24]
- The cost to move within the ship and also within the buffer, is Manhattan distance and each cell costs one minute [a,41]
- The cost for transfer between the buffer ship cell is 4 minutes plus the cost of movement within the ship or buffer [a,43]
- The cost for transfering between the truck to ship or buffer is 2 minutes plus the cost of movement within the ship or buffer [a,44]



Our Basic Understanding: Part 5/9 (Log File)

- Whenever a log file does not exist, the system will create and name the log file as “KeoghPort[Year].txt”, with the actual and current year replacing [Year] [a,48]
- The system should update the log file whenever the manifest is first opened, manifest is done being updated, unloading, loading, signing in, signing out, and comments by operator [a,47]
- The system should include timestamps to any event it adds to the log file [a,45]
- When writing the timestamps to the log file, the system should use the date format “YYYY-MM-DD HH:MM”, using local PST time with daylight savings and military time [c]
- When the month or day is in the single digits, the system should display this with a leading zero, as “0X” instead of just “X” [c]
- The system will reference the computer’s clock to maintain the accurate date/time
- The system should write to the log file using plain text [a,45]
- The system should only allow the user to add comments to the log file [a,48]

Our Basic Understanding: Part 6/9 (Hardware Specific)

- The system should be able to run on “the cheapest all-in-one PC at COSTCO” [a,28]

- The PC includes a standard mouse and keyboard [b]

Our Basic Understanding: Part 7/9 (Balancing)

- The system produces an order of operations list and simple animation to show the best order of balancing the ship and an estimate of how long it'll take [a,26]

- The system declares a ship is balanced if the total weight of containers on the port and total weight of containers on the starboard are "within 10% of each other" [a,37]

- The system declares a ship is unbalanced if the total weight of containers on the port and total weight of containers on the starboard are more than 10% apart" [a,37]

- If it is not possible to balance the ship, the system provides instructions to complete the special operation SIFT [a,39]

Our Basic Understanding: Part 8/9 (Power cut)

- The system should be able to “recover seamlessly from a power cut” [a,30]

Our Basic Understanding: Part 9/9

- The system should have high contrast colors and large fonts [a,29]
- The system should not have any sound prompts due to the surrounding area being too noisy [a,29]
- The system should have text English, basic enough for non-native speakers to understand [a,29].

Stakeholders

- The owner of the port (Mr. Keogh)
- Crane Operators: The system must function efficiency and correctly for them to perform your ship services to the highest level.
- Truck Drivers: They may have a tight schedule, so the better the system, the faster they can manage their time.
- Ship captain: Correctness of manifest and speed of loading/unloading as well as being balanced affects their profits.
- Other ports: Wrongly updated manifest slows down everyone else.
- Coast Guard: They need to make sure outbound ships comply with maritime law.
- Retail companies: Rely on shipments being on time.
- Software Maintainers: The simpler to maintain, the cheaper it will be to support.
- Crane Maintenance: If crane movements are optimized, the crane may have to be maintained less frequently.
- Dock security: Need to be more active while the ships/trucks are at the dock.
- Investors: Directly affected by how well the dock does financially.
- Homeland Security/FBI: Have interest in your log file being accurate.
- Insurance Companies: Interest in how the software affects operations and their liability.

Assumptions: Part 1/7

- The operators will follow each step the system lists perfectly without errors. [b]
- The operator will have all of the information/trucks ready 15 minutes before the ship arrives. [b]
- The set of containers being loaded onto the ship and being offloaded from the ship are unique. [b]
- The crane operators have perfect health, very good vision, and are not colorblind. [b]
- There is no specific order in which the trucks must be called. [b]
- No truck will both bring a container as well as take a container from the same ship. [b]
- Containers can be temporarily stacked up to the 10 rows on the ship as long as it returns to a maximum of 8 rows. [b]

Assumptions: Part 2/7

- If multiple containers have identical names, and one of these identically named containers is selected to be offloaded, you can move the container that is easiest to do. [b]

- The system should have text English, basic enough for non-native speakers to understand. In this case basic english is grade 9 and above in the United States [a]

- As the operator completes each step, the system should update the manifest [b]

Assumptions: Part 3/7 (about grid)

- The system should display a visual representation of the manifest on an 12 column by 8 row [a, 27]

Assumptions: Part 4/7(about buffer)

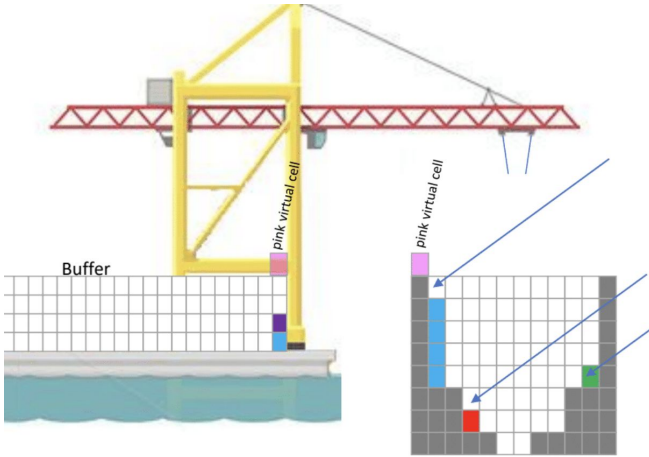
- The operator can use a 4 row by 24 column buffer but before the ship sails the buffer should be empty. [a 24]

- After a ship leaves the buffer will be empty. [b]

Assumptions: Part 5/7 (about cost/time estimate)

- The cost to move within the ship and also within the buffer, is Manhattan distance and each cell costs one minute [a,41]

- The system should not consider the time required for the truck to move into the loading zone when calculating approximate total time in loading/unloading ship. [a, 20]



Assumptions: Part 6/7 (About Containers)

- During a loading job, the system should prompt the user for a container’s weight soon after the operator measures the container’s weight from the crane. [b]

- During a loading job, the system should prompt the user for the container’s weight in kilos [a 33]

Assumptions: Part 7/7 (Load/Unload)

- The system does not handle the case where there is too little space to load containers onto the ship [b]

Inputs

- The manifest, a plain text file
  - Format of manifest:
    - One line per slot on the ship
    - Fields separated by “, “
    - Fields are (in order)
      - Position: [(vertical position),(horizontal position)]
        - vertical position is a non-negative integer between 0 - 8
        - horizontal position is a non-negative integer between 0 - 12
      - Container Weight: {(container weight in kilograms)}
        - container weight is a non-negative integer between 0- 99999
      - Container Name: (container name)
        - Ascii text
        - 255 characters maximum
        - Allowed characters
          - Uppercase and lowercase letters
          - Numbers
          - Spaces
          - Punctuation
        - Must have at least 1 printable character
        - Cannot start with space
        - Cannot be named “NAN” or “UNUSED”
        - “NAN” if slot does not physically exist
        - “UNUSED” if slot is empty

Inputs

- System clock

- User choice of load/unload or balance
  - This is taken from user clicks on load/unload or balance buttons respectively

- The number of containers being loaded
  - This is taken from user keyboard input
  - Non-negative integer

- Names of containers being loaded
  - This is taken from user keyboard input
  - Same format as in the manifest

- Weight of containers being loaded
  - This is taken from user keyboard input
  - Non-negative integer between 0- 99999

- User Choice of containers being unloaded
  - This is taken from user clicks on valid slots on the ship

- User Choices
  - This is taken from user clicks

Outputs

- An updated manifest
- A reminder to send updated manifest to ship captain
- An updated log file
- Visual depiction of the ship slots
- Visual depiction of the buffer
- Number of moves to make
- Estimated time to complete all moves
- Visual depiction of moves being made

Scenario I: Part 1/4

- John Smith has been a crane operator at Mr. Keogh's Port for 4 years
- He works full time from Wednesdays to Sundays, typically during the 4pm-12am shift
- He has a high school diploma and crane operating certification
- He climbs up the crane and logs in at 4:02pm with his name
- He checks his email and finds a transfer list for a ship called Rostam estimated to arrive at 4:45pm
- The transfer list says "Theres a truck coming with a container labeled from Walmart. Load it on the Rostam ship and unload a container from Specialized Bicycles"
- At 4:15, John receives a manifest "Rostam.txt" from the ship 30 minutes before its expected arrival. It outlines all containers on the ship and their weights. He notices the container labeled Specialized Bicycles

Scenario I: Part 2/4

- The Rostam arrives at 4:48pm
- John goes to the software and selects the load/unload task
- The software prompts for the manifest file and he uploads it
- There is 1 container specified on the manifest
- The software displays a diagram of the ship with the containers (name and weight) in their proper locations
- The software prompts for the containers to offload from the ship. John selects “Specialized Bicycles” by clicking on the container.
- The software prompts for the names of the containers to be loaded onto the ship
- John inputs “Walmart”. There is only one container to load.

- John starts the task and the software produces a list of operations. He can see that the task will take an estimated 24 minutes to complete.

Scenario I: Part 3/4

- The first operation is to unload Specialized Bicycles from [01,01]
- John calls out “Specialized Bicycles truck to the loading zone”
- John uses his crane to pick up Specialized Bicycles from the ship at the specified location and moves it over to the truck
- The next and last operation is to load Walmart to [01,01]
- John calls out “Walmart truck to the loading zone”
- John uses his crane to pick up the Walmart container and loads it to the specified location
-
- John reads the crane’s scale and enters the weight for the Walmart container
- John finishes the task at 5:16pm and the software outputs the final manifest with the correct naming format (“OUTBOUND” is appended”)

Scenario I: Part 4/4

- The software prompts John with a reminder to send out the manifest to the ship captain.

- John emails out the manifest.

- At 11:57pm Sally arrives and John logs off.

Scenario II: Part 1/2

- Sally arrives for her shift and logs on at 12:01am
- She checks her email and sees a notice for an incoming ship called Stargazer that requires balancing
- Sally receives a manifest at 1:37am
- The ship arrives at 1:52am and Sally starts a balance task on the software
- Sally uploads the manifest to the software
- The software produces a list of operations. One is to move “Target (Electronics)” from [01,02] to [01, 12]
- Sally operates the crane to move the container to the specified location
- Sally marks the step as complete and the system log records this operation
- The manifest is also updated

Scenario II: Part 2/2

- Sally marks the task as complete and the software outputs the manifest file with the modified name (“OUTBOUND” appended to the name).

- The software prompts a reminder to Sally to send out the manifest

- Sally emails the manifest to the ship captain

Scenario III

- The FBI is investigating shipments from the Rostam, and they ask Mr. Keogh for the log files of operations between September 12 - September 27 2024 (current year)
- Mr. Keogh emails the crane operator, John, to send him the YTD log file
- John opens the Desktop on his computer and sees the log file
- John adds the log file as an attachment to an email and sends it to Mr. Keogh
- Mr. Keogh browses through the time stamps to retrieve all information within the specified dates.
- Mr. Keogh copies and pastes the correct lines of the log files to a new file, and sends the copy to the FBI through email.

Scenario IV

- During a stormy night on Thursday October 31st, John is working his shift
- He is doing a loading/unloading job for a ship called BlackPearl (the manifest is named BlackPearl.txt)
- The system tells John to move a container called “Home Depot Paint” from [04,01] to the loading zone
- He is still moving the container to the loading zone and hasn’t marked the step complete on the system
- All of the sudden the power goes out at 10:51pm
- The crane uses its brakes to stay in place, but the PC the system is running on shuts down
- By 11:21pm, power is restored, and John reopens the system
- When opened, the system still shows the same step as right before the power went out
- The manifest and log files are the same as they were right before the power went out
- John moves the container to the loading zone, marks the step as complete on the system, and goes to the next step

Maintenance Plan: Part 1/2

While we cannot anticipate any eventuality, we recognize that the following may force us to update the software in the coming years

- If the software contains any minor bugs/undesired behavior, then the software would be updated to correct these mistakes

- If ships of differing sizes are allowed to use your services, then the user interface would need to be updated to allow for varying ship sizes

- If the crane specifications like speed changes, then the time estimation would need to be updated to reflect the proper values

We will update our software to handle the above issues, for free, within 2 years of delivery.

Maintenance Plan: Part 2/2

- If you want the optimal way to balance a ship while loading/unloading, then the algorithm would have to be updated to reflect balancing desires with fast loading/unloading

- If you want to allow late trucks to be loaded onto the ship while it is in the middle of the loading/unloading process, then the algorithm would have to be updated to allow for dynamic changes and fast computations

We will update our software to handle the above issues, for a nominal fee, not to exceed 50% of our original agreement.

Training and Documentation

We will provide a user manual that describes how the user interacts with the software. This includes detailed diagrams explaining input options and example output showing the operation process. There is also information about the complete capabilities of our software and any warnings about misuses.

Additionally, a video will be provided to show the software in its full capacity. This video will present both the loading/unloading process and the balancing process. The user interface will be displayed along with each the layout of each screen. Each resulting step is also shown to highlight the user process.

Compliance with Regulation

- The system must ensure that ships are either legally balanced by Maritime law [a, 39]
- If the ship is impossible to balance, the system must execute the SIFT operation [a, 39]
- The system must accurately and frequently update the log file for legal purposes [a, 45]
- The system must accurately and frequently update the manifest for legal purposes [a, 21]

Acceptance Testing

- The system should be able to produce the best order of operations list for any load/unload job in under 6 minutes
  - To test this, 25 different manifests are input into the system. If the system can produce a load/unload job in under 6 minutes for each of the 25 manifests, the test is accepted.
- The system should be able to produce the best order of operations list for any balance job in under 3 minutes
  - To test this, 25 different manifests are input into the system. If the system can produce a balance job in under 3 minutes for each of the 25 manifests, the test is accepted.
- The system should be able to save its previous state before a simulated power outage during 50/50 test trials
- The log file should update within 2.5 seconds after an event that needs to be logged occurs (manifest being opened, operator signing in/out, etc)
  - If each of 50 test log updates occur within 2.5 seconds after an event, the test is accepted
- The manifest should update within 1.5 seconds after a step is completed
  - If each of 50 manifest updates occur within 1.5 seconds after an event, the test is accepted

Contract

- We propose to create a system that will solve the task at hand
- We will have the final deliverable on or before Friday, December 13th, 2024 at 11:59pm
- For the final deliverable, we are asking for $12,000
- We may require up to 5 hours of your time (or time of a qualified proxy) to answer additional questions. Questions should be answered within 48 hours.
- We will not honor any requests “feature creep”, at this price point and delivery date.
- If we fail to add the balancing mode to the system, we ask for $11,000 (-8.3%)
- If we fail to add the load/unload mode to the system, we ask for $9,600 (-20%)

Contract

Signed (by John Keogh) _____ Date _____

Signed (for QuickShip Inc.) _____ Date _____

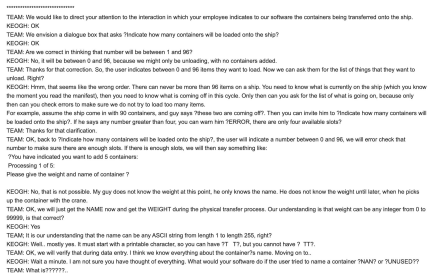
References

[a] Problem Overview Slides https://tinyurl.com/y7mfdt5h

[b] Interview with Mr. Keogh on October 19 2024 https://tinyurl.com/56bhychj

[c] Time format instruction email

[d] Sample elicitation email (The one about loading/unloading) ->



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TEAM: We would like to direct your attention to the interaction in which your employee indicates to our software the containers being transferred onto the ship.
KEOGH: OK
TEAM: We envision a dialogue box that asks ?Indicate how many containers will be loaded onto the ship?
KEOGH: OK
TEAM: Are we correct in thinking that number will be between 1 and 96?
KEOGH: No, it will be between 0 and 96, because we might only be unloading, with no containers added.
TEAM: Thanks for that correction. So, the user indicates between 0 and 96 items they want to load. Now we can ask them for the list of things that they want to unload. Right?
KEOGH: Hmm, that seems like the wrong order. There can never be more than 96 items on a ship. You need to know what is currently on the ship (which you know the moment you read the manifest), then you need to know what is coming off in this cycle. Only then can you ask for the list of what is going on, because only then can you check errors to make sure we do not try to load too many items.
For example, assume the ship come in with 90 containers, and guy says ?three two are coming off?. Then you can invite him to ?Indicate how many containers will be loaded onto the ship?. If he says any number greater than four, you can warn him ?ERROR, there are only four available slots?
TEAM: Thanks for that clarification.
TEAM: OK, back to ?Indicate how many containers will be loaded onto the ship?, the user will indicate a number between 0 and 96, we will error check that number to make sure there are enough slots. If there is enough slots, we will then say something like:
?You have indicated you want to add 5 containers:
Processing 1 of 5:
Please give the weight and name of container ?

KEOGH: No, that is not possible. My guy does not know the weight at this point, he only knows the name. He does not know the weight until later, when he picks up the container with the crane.
TEAM: OK, we will just get the NAME now and get the WEIGHT during the physical transfer process. Our understanding is that weight can be any integer from 0 to 99999, is that correct?
KEOGH: Yes
TEAM: It is our understanding that the name can be any ASCII string from length 1 to length 255, right?
KEOGH: Well, mostly yes. It must start with a printable character, so you can have ?T T?, but you cannot have ? TT?.
TEAM: OK, we will verify that during data entry. I think we know everything about the container?s name. Moving on to.
KEOGH: Wait a minute. I am not sure you have thought of everything. What would your software do if the user tried to name a container ?NAN? or ?UNUSED??
TEAM: What is?????..