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Main BathroomQueueProgram

Implement a queue as an array with a maximum value (100)

- Declare an int variable to store the index for the front of the queue
- Declare an int variable to store the number of people in the queue at any given time

Use one integer value to track how many men are in the bathroom and one integer value to track how many women are in the bathroom (only one can be above 0 at a time)

Use one integer status variable with possible values of -1, 0, and 1 to determine bathroom occupancy

Prompt the user to enter the mode of execution for the program
The user inputs ‘1’ for automatic execution or ‘2’ for manual execution
If the user inputs a number other than 1 or 2, loop the prompt until they enter a proper selection

If automatic mode is selected:

Every other cycle (odd cycles), if the bathroom is occupied, one person leaves the bathroom and the proper counter variable is decremented

Randomly determine if a man will try to enter the bathroom next or if a women will try to enter the bathroom next

If a man is trying to enter:
Call Procedure man_wants_to_enter
If the man can enter increment the menInBathroom variable by 1
Otherwise add them to the end of the Queue

If a woman is trying to enter:
Call Procedure woman_wants_to_enter
If the woman can enter, increment the womenInBathroom variable by 1
Otherwise add them to the end of the queue

If the first person in line is of the proper gender, or the bathroom is empty:
They enter the bathroom
The bathroom status is set equal to their gender(if necessary)

The queue count is decremented
The person behind them in line is now at the front of the line(if applicable)
The proper variable to count the amount of that gender in the bathroom is incremented

Display the cycle number
Call Procedure display_status
Call Procedure display_queue
Reset loop specific variables
Increment cycleNumber variable
Loop 20 more times

If manual mode is selected:

Every other cycle (odd cycles), if the bathroom is occupied, one person leaves the bathroom and the proper counter variable is decremented

Prompt the user to enter 1 (for a woman as the next person to try to enter) or 2 (for a man as the next person to try to enter)

If 1 is entered:
Call Procedure woman_wants_to_enter
If the woman can enter, increment the womenInBathroom variable by 1
Otherwise add them to the end of the queue

If 2 is entered:
Call Procedure man_wants_to_enter
If the man can enter increment the menInBathroom variable by 1
Otherwise add them to the end of the queue

The queue is traversed until a person who can enter the bathroom is found or we reach the end of the queue(as per this instruction " If in manual operation the program should automatically allow the next eligible person in the queue to enter the bathroom in a fair fashion (no cheating).")

If an eligible person is found:
They enter the bathroom
The bathroom status is set equal to their gender(if necessary)
The queue count is decremented
If they were in front of the line the index pointing to the front of the line is incremented
Otherwise their spot in the queue is set to 0 to indicate nobody (will be skipped in future processing)
The proper variable to count the amount of that gender in the bathroom is incremented

Display the cycle number

Call Procedure display_status
Call Procedure display_queue
Reset loop specific variables
Increment cycleNumber variable
Loop 20 more times
End Program

Procedure woman_wants_to_enter
If the bathroom is occupied by men or there are people in queue, return 1(false)
Otherwise return 0(true)

Procedure man_wants_to_enter
If the bathroom is occupied by women or there are people in queue, return 1(false)
Otherwise return 0(true)

Procedure woman_leaves
If the number of women in the bathroom after one has left is zero, return 0 to indicate that the bathroom is empty
Otherwise return 1 to indicate that the bathroom is still occupied by women

Procedure man_leaves
If the number of men in the bathroom after one has left is zero, return 0 to indicate that the bathroom is empty
Otherwise return -1 to indicate that the bathroom is still occupied by men

Procedure display_status
Display the occupancy status of the bathroom
Display the number of men in the bathroom(if applicable)
Display the number of women in the bathroom(if applicable)

Procedure display_queue
Display the occupancy status of the waiting queue
Display the gender and position in queue of each person in line (if applicable)