# RESIT ASSESSMENT AND FEEDBACK

The module will be 100% coursework. This Resit assignment is divided into three sections. S Students are required to complete:

1. **Essay on Theory of Swift Even Flow (35%)**

Students should read appropriate material regarding the importance of managing flow and productivity. The key theory to investigate is TSEF (Theory of Swift Even Flow). A list of books and articles\* have been suggested to get you started. The objective of this scholarship is to help students to critically evaluate operations management relative to traditional management.

(1,500 words)

\* Schmenner, R. W. (2012) *Getting and Staying Productive, Applying Swift Even Flow to Practice*, Cambridge, UK, Cambridge University Press

\* Schmenner, R.W., 2004. Service businesses and productivity. Decision Sciences, 35(3), pp.333-347

\* Schmenner, R.W. and Swink, M.L., 1998. On theory in operations management. *Journal of operations management*, *17*(1), pp.97-113

\* Fredendall, L.D., Craig, J.B., Fowler, P.J. and Damali, U., 2009. Barriers to swift, even flow in the internal supply chain of perioperative surgical services department: a case study. *Decision Sciences*, *40*(2), pp.327-349

\*Devaraj, S., Ow, T.T. and Kohli, R., 2013. Examining the impact of information technology and patient flow on healthcare performance: A Theory of Swift and Even Flow (TSEF) perspective. *Journal of Operations Management*, *31*(4), pp.181-192.

1. **Operations Management Calculations (30%)**

B1) Water Tech is a manufacturer of high-end electric toothbrushes. For each toothbrush, there is a sequence of assembly steps performed by five workers. Each worker does two tasks. Inventory buffers are allowed between workers. (10%)

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| --- | --- | --- |
| Worker | Task | Time (seconds) |
| A | T1 | 40 |
| A | T2 | 25 |
| B | T3 | 20 |
| B | T4 | 15 |
| C | T5 | 10 |
| C | T6 | 15 |
| D | T7 | 10 |
| D | T8 | 20 |
| E | T9 | 25 |
| E | T10 | 35 |

1. What is the capacity of this process (toothbrushes per minute)?
2. Suppose two workers could be hired, F and G, and they take the same time to complete tasks as the current five workers. F and G can be assigned to work on the same pair of tasks as one of the current workers. For example, F could be assigned tasks T1 and T2 (just like worker A) while G is assigned T5 and T6 (just like worker C). They cannot be assigned tasks that are currently assigned to two workers. For example, F cannot be assigned to tasks T2 and T3 (because they are currently being done by workers A and B). What is the capacity of this process with workers F and G included (toothbrushes per minute)?
3. Return to the case of 5 workers. Suppose the assignment of tasks to workers can change but the sequence of tasks must remain the same, workers must be assigned to consecutive tasks and each task can be assigned to only one worker. For example, worker A could do tasks T1-T3 (because they are consecutive) but cannot be assign T1, T2 and T4. If worker A is assigned to tasks T1-T3, then worker B’s first task must be T4 (worker B cannot also be assigned to task T3). Because a U-shaped line is used, tasks T1 and T10 can actually be considered consecutive tasks – worker A could be assigned tasks T10, T1 and T2. What would the maximum capacity be after possibly reassigning tasks (toothbrushes per minute)?

B2) A process requires 6 tasks, A, B, C, D, E and F, that must be performed in that order. Currently there are 3 employees that are equally skilled at each task. Employee 1 is assigned tasks A and B, employee 2 is assigned tasks C and D and employee 3 is assigned tasks E and F. The task times (all in seconds) are given in the process diagram below. For example, task A requires 90 seconds. (10%)



1. Suppose the system started without any work in process inventory (i.e., an empty system). How long would this process take to produce 10 units (in seconds)?
2. Suppose now the 3 employees can be assigned to any task, but employees must be assigned to consecutive tasks (e.g., an employee cannot be assigned tasks B and D). What would be the processes’ maximum capacity (units per hour)?

B3) **Black Rose** is a very popular hair salon. It offers high-quality hair-styling and physical relaxation services at reasonable prices, so it always has unlimited demand. The service process includes five activities that are conducted in the sequence described below. (10%)

(The time required for each activity is shown in parenthesis):

**Activity 1:** Welcome a guest and offer homemade herbal tea. (10 minutes)

**Activity 2:** Wash and condition hair. (10 minutes)

**Activity 3:** Neck, shoulder and back stress release massage. (10 minutes)

**Activity 4:** Design the hair style and do the hair. (25 minutes)

**Activity 5:** Check out the guest. (5 minutes)

Three servers (S1, S2, and S3) offer the services in a worker-paced line. The assignment of tasks to servers is the following:

S1 does Activity 1.

S2 does Activities 2 and Activity 3.

S3 does Activities 4 and Activity 5.

1. Which server is the bottleneck of the process?
2. What is the utilization of server 2?
3. What is the average labor utilization of the servers? Assume the process operates at its capacity.
4. Assume a wage rate of $18 per hour. What are the direct labor costs for one guest?
5. To increase the service rate, Black Rose is considering two alternatives:

* Alternative I: To hire a new employee to help anyone (and only one) of the servers without changing the tasks performed by each server.
* Alternative II: To redesign the assignment of tasks to servers. For this, Black Rose is evaluating to reassign Activity 5 from S3 to S1.

What would be the costs of direct labor of serving one guest under each of the two alternatives? Assume that the system operates at its capacity.

1. **Short Case Study: Clear Eyes Cataracts Clinic** **(35%)**
2. Using information from the Clear Eyes Cataracts Clinic case study, what reasons would you suggest contribute to the clinic being a profitable business? \* (15%)

1. Using the annual demand and processing time information contained in Exhibit 2:

(10%)

* 1. Calculate the utilization of the resources by each Job Title
  2. Do you think that these numbers are high, and if so, how can they be maintained if patient ‘no-shows’ are such a high percentage of scheduled appointments? \*\*

1. How would the patient volume and resource utilization numbers change if Clear Eyes managed to half the number of patients who complete the intake task but fail to show up for surgery? How would this impact on productivity?

(10%)

*\* You should be able to identify at least six reasons*

*\*\* There are three points to consider*