Personal Schedule for Productive Activities

Mihai Budurean

January 2024

1 Problem description

Mihai wants to spend his day productively after will has finished college. At this moment he has a part-time job, where he has to work a minimum of 30 hours per week, with the possibility of a maximum of 5 extra hours per week. Besides the job, he has two more passions that could increase his weekly income, teaching and graphic design. he does teaching sessions with high school students and found a platform where he can make money from graphic materials. For these two activities, he has a minimum weekly target that he wants to achieve to improve his skills in teaching and graphic design. Optimize the total income that he can produce weekly, considering that he wants to focus on these activities from Monday to Friday, with a maximum of 12 hours spent weekly. In the tables below, there are details about the activities mentioned before.

Activity	**Income**
Work Hour	27 €
Teaching Session	35 €
Graphic Material	14 €

Table 1: Income for activities

Activity Unit	**Time spent**
Work	1 hour
Teaching	1.5 hours
Graphic Material	0.6 hours

Table 2: Time spent for one activity

Activity	**Minimum Target**
Work Hours	30
Teaching Sessions	5
Graphic Materials	10

Table 3: Minimum personal target for activities

2 Variables

Day/Activity	Work Hours	Teaching Sessions	Graphic Materials
Monday	w_1	t_1	g_1
Tuesday	w_2	t_2	g_2
Wednesday	w_3	t_3	g_3
Thursday	w_4	t_4	g_4
Friday	w_5	t_5	g_5

Table 4: Variables table

3 Objective Function

$max(27 \cdot (w_1+w_2+w_3+w_4+w_5)+35 \cdot (t_1+t_2+t_3+t_4+t_5)+14 \cdot (g_1+g_2+g_3+g_4+g_5))$

4 Constraints

$$
\begin{cases}
w_1 + w_2 + w_3 + w_4 + w_5 & \geq 30, MinimumHoursofWorkConstraint \\
w_1 + w_2 + w_3 + w_4 + w_5 & \leq 35, MaximumHoursofWorkConstraint \\
t_1 + t_2 + t_3 + t_4 + t_5 & \geq 5, MinimumTeachingSessionsConstraint \\
g_1 + g_2 + g_3 + g_4 + g_5 & \geq 10, MinimumGraphicMaterialsConstraint \\
w_1 + 1.5 \cdot t_1 + 0.6 \cdot g_1 & \leq 12, MondayTimeConstraint \\
w_2 + 1.5 \cdot t_2 + 0.6 \cdot g_2 & \leq 12, TuesdayTimeConstraint \\
w_3 + 1.5 \cdot t_3 + 0.6 \cdot g_3 & \leq 12, WednesdayTimeConstraint \\
w_4 + 1.5 \cdot t_4 + 0.6 \cdot g_4 & \leq 12, ThursdayTimeConstraint \\
w_5 + 1.5 \cdot t_5 + 0.6 \cdot g_5 & \leq 12, FridayTimeConstraint \\
w_1, w_2, w_3, w_4, w_5 & \geq 4, WorkingHoursLowerBoundConstraint \\
w_1, w_2, w_3, w_4, w_5 & \leq 8, WorkingHoursUpperBoundConstraint \\
t_1, t_2, t_3, t_4, t_5 & \geq 1, TeachingSessionsLowerBoundConstraint \\
t_1, t_2, t_3, t_4, t_5 & \leq 3, TeachingSessionsUpperBoundConstraint \\
g_1, g_2, g_3, g_4, g_5 & \geq 1, GraphicMaterialsLowerBoundConstraint
\end{cases}
$$