San José State University
Department of Design / Industrial Design Program
DSID 41, Materials and Processes I, Section 1, Spring 2016

<table>
<thead>
<tr>
<th>Instructor:</th>
<th>Ron Boeder</th>
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<tr>
<td>Office Location:</td>
<td>Art 227</td>
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<tr>
<td>Telephone:</td>
<td>(408) 294-4380</td>
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<td>Email:</td>
<td><a href="mailto:Ronald.Boeder@SJSU.edu">Ronald.Boeder@SJSU.edu</a></td>
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<tr>
<td>Office Hours:</td>
<td>TR 11:20 AM – 12:20 PM</td>
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<td>Class Days/Time:</td>
<td>TR 8:30 PM – 11:20 PM</td>
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<td>Classroom:</td>
<td>Art 105</td>
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<tr>
<td>Prerequisites:</td>
<td>Declared BSID Major; DSID 21; DSID 22; DSID 32; DSID 32A</td>
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<tr>
<td>Corequisites:</td>
<td>None</td>
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<tr>
<td>Course Fees:</td>
<td>None</td>
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Canvas Course Management Website

Copies of the course materials such as the syllabus, assignment handouts, grading, etc. may be found on the DSID41 course Canvas website. You may find your link to this website on MySJSU, along with your login/password info. You are responsible for regularly checking with the messaging system in CANVAS for course updates, assignments, etc. All class correspondence will also be managed through the class CANVAS site. If you do not check Canvas often, you should set up your email forwarding to forward all class correspondence to your preferred email address.
Course Description
Materials and Processes I will introduce a range of the most common manufacturing processes, materials, and finishing operations. This introduction will be accomplished through a combination of lectures, study/research, design & critique, and field trips to manufacturer’s facilities. All design involves requirements and constraints, some of which are dictated by materials and manufacturing processes. The designer can take advantage of these requirements and constraints, and utilize them as “opportunities” to help develop innovative and successful product designs. To take advantage of these opportunities industrial designers must understand the requirements and constraints of each process, be able to select the best material/process, be able communicate the rationale for selecting a given process to their counterparts in Engineering and Marketing, and to be able to have a useful development dialogue with engineers and manufacturers.
This theme will be reinforced by researching, designing, and depicting in detail, multiple chairs, each designed to utilize a particular material and manufacturing process. Descriptive sketching, including hand drawn scale 2D scale orthographic views, are highly critical for success in this course.

Course Goals and Student Learning Objectives
Upon successful completion of this course, students will be able to:
LO1 Describe the major manufacturing processes, and articulate the pros, cons, and basic design rules and guidelines.
LO2 Integrate the selection of materials and manufacturing processes with the design development process.
LO3 Employ research methods to source information about materials and manufacturing processes.
LO4 Depict and communicate concepts/details required to communicate with engineers and manufacturers so as to procure manufacturing quotations and develop designs for production.
LO5 Select or recommend materials and manufacturing processes appropriate to a design.
LO6 Explain and communicate the rationale for selecting particular materials and manufacturing processes.
LO7 Exhibit an uncompromising and high professional standard for 2D skills, techniques, tools, materials, and craftsmanship.
L8 Collect, archive, edit, and produce a portfolio of work which can be used as a future reference document.
LO9 Discuss, critique, and engage actively in professional review of their and their peers work.
Course Content & Structure

The course will be structured with Lectures, Project Presentations and Sample Presentations. These will be supported by reading from the textbook and supplemental reading materials. Field trips and Manufacturing videos will be able to reinforce what is learned in the classroom lectures. Students will be required to take Quizzes and Final Exam (including grading tests as a group) and will also be required to turn in a well designed, organized and formatted Materials and Processes Binder at the end of the term.

Required Texts/Readings

Textbooks (Required by 2nd class meeting)


Other Recommended Readings


Industrial Design Techniques and Materials. Raymond Guidot (Editor), Jean-Baptiste Touard (Contributor), Jean Grenier (Contributor), Jean-Jacques Salomon (Contributor). Publisher: Flammarion (September 5, 2006). ASIN: B005X4FBUW

Required Materials List

Additional funds of about $250 will be required to purchase the materials for the course 3-ring binder/portfolio $10-60, 100 clear page protectors $10, index tabs $10, ream of 8.5 x 11 bond paper $10, pens/pencils $5, markers $50, ink for printing project research photos $20, and for travel expenses(fuel) to and from 6 - 8 field trips throughout the greater Bay Area $110. Ride-sharing can of course reduce this cost. Note: Many students prefer to use a high quality portfolio or custom made binder which could cost up to $100 additional.

Other suggested materials

Students may want to purchase inexpensive products (cheap plastic toys, small metal accessories; think Dollar Store.) to take apart and analyze the materials and manufacturing processes, and present with their weekly assignment. These items should cost approximately $50.00 total. However, this is optional. Students can alternatively bring in products that they already own.

Shop Test

The Department of Design requires that Industrial Design students attend and pass the shop safety orientation at least once each year. We will be showing the video in class and then you will have at least a week to review the video again on your own as it is posted online (http://www.sjsu.edu/atn/services/webcasting/events/shopysafety.html) now. The shop test date will be announced the first day of class. That will be the only date that you will be able to take the shop test for this course so make sure you have studied up and paid your shop test fee at the bursars office before that date. You must provide proof of enrollment and the original receipt from the bursar’s office that you have paid the required $20 shop fee to fund #62089 prior to taking the test.

Library Liaison

Design Deptartment Librarian
Teresa Slobuski
Teresa.Slobuski@sjsu.edu
phone: (408) 808-2318

Classroom Protocol

Active participation in class activities is a significant factor in a student’s success in the Industrial Design program. Active learning facilitates mental growth, skill enhancement, creates a life long learner and improves the goals of becoming a good designer. Students are expected to be on time to class and when a class critique is planned, work is to be
taped/pinned up to the walls by 10 minutes after the official start of the class period. Be ready to start the critique by 15 minutes after the class officially starts. Students are to be respectful of the professor and their peers and any disruptive activities in the classroom will result in the student being asked to leave the class. Arriving late to class without prior arrangement and approval from the professor is considered disruptive. If the student cannot be in the classroom by the start of class, please do not interrupt the class in session by entering the classroom. If a student encounters any problems that inhibit their ability to participate in the class, please provide as much advance notice as possible to the instructor so that he/she may respond and inform the student in a timely manner. Students are expected to leave the classroom in a clean condition at the end of each class meeting so that the next class has an organized, clean room waiting for them.

**Dropping and Adding**

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic calendar web page located at http://www.sjsu.edu/academic_programs/calendars/academic_calendar/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

**Assignments and Grading Policy**

Each week (subject to change, more complex projects may be afforded additional time with advance notice) the professor will lecture on a manufacturing process, and a field trip will be conducted or videos will be viewed. The professor will also introduce materials, finishing, and joining processes related to that manufacturing process. Students will then complete an assignment. Typically this assignment will be the design of a chair in a particular manufacturing process, and in a particular material. The students will then present their chair design and provide an example of that material and manufacturing process. A physical example is presented, but not required. Each assignment must contain the following pages/components:

1. Cover page, including assignment name, student name, professor name, and photos of products manufactured in this process (prefer student taken photos)
2. “1-pager” describing the assigned manufacturing process in text form
3. “1-pager” describing the assigned material (text and photos)
4. Images/sketches/text describing the manufacturing process, rules & guidelines, and equipment (prefer hand-drawn)
5. Design concepts/thumbnail sketches with notes and details (1 page minimum)
6. Scale, dimensioned, hand-drawn orthographic view mechanical drawings (3 views minimum. Assembly drawings, and each part individually)*
7 Exploded view with call-outs, and BOM with all parts (including fasteners)*
8 Hand-drawn design details: section views, full-scale details, manufacturing notes, wall thickness, draft, fillets and radii, etc. No 2D or 3D CAD*
9 Sketches describing production tooling, jigs, fixtures, finishing operations, etc.
10 Perspective view sketches with color/shading that effectively describe the form and details, including the typical view, plus rear and underside (2 views minimum, hand-drawn/digitizer and hand-rendered, or digital rendered, No 3D CAD)

* Most important items

Students will be engaged in lectures, project presentations, sample presentations, and field trips during class meeting times and they will be assessed on engagement in those activities in their Participation grade (LO 8). Students will have homework assignments to do outside of class (up to 12 hours per week) that include reading, sketching, and research (LO 1-6). They will be required to turn in their final Materials and Processes Binder, the last day of class (LO 7). The final exam will be held on the second to last day of class, and graded by peers on the last class date. Grading will follow the standard SJSU A-F system.

A+, A, A- / 100+ - 91% / Excellent
B+, B, B- / 90 – 81% / Above Average
C+, C, C- / 80-71% / Average
D / 70-61% / Below Average
F / Below 61% / Failure

Grading is weighted as follows:
Assignments - 12 (LO 1-6): 60%
Participation (LO 8): 10%
Quizzes - 2 (LO 1-6): 10%
Final Materials and Processes Binder (LO 7): 15%
Final Exam (LO 1-9): 5%

The typical structure of each week will be as follows:
Day 1: Homework Due (Present/Review/Critique), Next Lecture/Homework Assignment
Day 2: Field Trip, or watch manufacturing videos and work in class, and/or Quiz

Grades for assignments will be divided evenly throughout the semester and receive equal credit. All assignments are due on time. No late work is accepted. No assignments will be accepted via email or Canvas. However, your final binder/portfolio will be reviewed at the end of the semester, and will be graded on completeness (so you should include all assignments, even those not previously turned in) and presentation quality. Therefore, all projects should be included in this binder. Extra credit is not possible in this course as the workload is significant enough. A passing grade for this course is a C. The Participation grade in this course will be assessed through your engagement in presentations, critiques, providing videos, and attending field trips. Actively engaging
and exhibiting life-long learning skills during class are the mode by which participation is assessed.

University Policies

Academic integrity

Your own commitment to learning, as evidenced by your enrollment at San José State University and the University’s Academic Integrity Policy (Academic Senate Policy S07-2), require you to be honest in all your academic course work. Faculty members are required to report all alleged violations of the Academic Integrity Policy to Student Conduct and Ethical Development. Instances of academic dishonesty will not be tolerated. Cheating or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failure in the course and administrative sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that San José State's Academic Integrity Policy requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Disability Resource Center (DRC) at http://www.drc.sjsu.edu/ to establish a record of their disability.

Student Technology Resources

Though it is not anticipated that you will need any of this for this class, computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and on the 2nd floor of the Student Union. Computers are also available in the Martin Luther King Library. A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include digital and VHS camcorders, VHS and Beta video players, 16 mm, slide, overhead, DVD, CD, and audiotape players, sound systems, wireless microphones, projection screens and monitors.

Learning Assistance Resource Center

The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic potential and to inspire them to become independent learners. The Center's tutors are trained and nationally certified by the College Reading and Learning Association.
(CRLA). They provide content-based tutoring in many lower division courses (some upper division) as well as writing and study skills assistance. Small group, individual, and drop-in tutoring are available. Please visit the LARC website for more information at http://www.sjsu.edu/larc/.

**SJSU Writing Center (Optional)**

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. The Writing Center website is located at http://www.sjsu.edu/writingcenter/about/staff/.

**Peer Mentor Center**

The Peer Mentor Center is located on the 1st floor of Clark Hall in the Academic Success Center. The Peer Mentor Center is staffed with Peer Mentors who excel in helping students manage university life, tackling problems that range from academic challenges to interpersonal struggles. On the road to graduation, Peer Mentors are navigators, offering “roadside assistance” to peers who feel a bit lost or simply need help mapping out the locations of campus resources. Peer Mentor services are free and available on a drop–in basis, no reservation required. The Peer Mentor Center website is located at http://www.sjsu.edu/muse/peermentor/
DSID 41 / Materials and Processes 1,  
Spring 2016, Course Schedule

Schedule is subject to change with fair notice (one week) in class or via notice on CANVAS.

Table 1 Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics, Readings, Demos, Assignments, Deadlines</th>
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</thead>
</table>
| 1    | R 1/28| Lecture Topic: Introduction - Review of syllabus, introduction to materials and processes, course content, assignment structure, course expectations, project template, materials requirements, photos, Professor introduction, and field trip paperwork.  
Thompson Reading Assignment: Pages 10 – 19  
Lefteri Reading Assignment: Pages 6 – 9  
Assignment: Preparation - Develop project template, purchase course materials/books, define typical chair  
Deadline: None  
Field Trip: None  
Quiz: None  
Other: Reading Assignment - Mechanics of Materials D2L Handout, “1-pager” Template and Project Template on D2L |
| 2    | T 2/2 R 2/4| Lecture Topic: Materials and Mechanics of Materials  
Thompson Reading Assignment: Pages 418 - 490  
Lefteri Reading Assignment: None  
Assignment: Gather Plastic Samples  
Deadline: Project templates, course materials, books, chair ergonomics (LO 1-10)  
Field Trip: None  
Quiz: None  
Other: Guest Lecture –Mechanics of Materials |
| 3    | T 2/9 R 2/11| Lecture Topic: Plastic Fabrication  
Thompson Reading Assignment: None  
Lefteri Reading Assignment: None  
Assignment: Chair #1 – Plastic Fabricated Chair  
Deadline: Plastic parts (LO 1-10)  
Field Trip: Plastic Fab Shop  
Quiz: Mechanics of Materials  
Other: Reading assignment - Plastic Fabrication D2L Handout, Class Activity -identifying plastics, Video Viewing - TBD |
<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topic</th>
<th>Reading Assignments</th>
<th>Assignment</th>
<th>Deadline</th>
<th>Field Trip</th>
<th>Quiz</th>
<th>Other</th>
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<tbody>
<tr>
<td>4</td>
<td>Lecture Topic: Machining</td>
<td>Thompson Reading Assignment: Pages 182 - 189</td>
<td>Letteri Reading Assignment: Pages 12 - 22</td>
<td>Assignment: Chair #2 – Machined Aluminum Chair</td>
<td>Field Trip: Machine Shop</td>
<td>Quiz: None</td>
<td>Other: None</td>
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<td>Deadline: Chair #1 – Plastic Fabricated Chair (LO 1-10)</td>
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<td>5</td>
<td>Lecture Topic: Sheet Metal Fabrication – Brake forming and Punching</td>
<td>Thompson Reading Assignment: Pages 260 – 265, 148 - 153</td>
<td>Letteri Reading Assignment: Pages 44 - 45</td>
<td>Assignment: Chair #3 – Brake Formed and Punched Sheet Metal Chair</td>
<td>Field Trip: Sheet Metal Fab Shop</td>
<td>Quiz: None</td>
<td>Other: None</td>
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<td>Deadline: Chair #2 – Machined Aluminum Chair (LO 1-10)</td>
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<td>6</td>
<td>Lecture Topic: Sheet Metal Fabrication – Laser Cutting, Roll Forming, Tube Bending</td>
<td>Thompson Reading Assignment: Pages 248 – 253, 110 – 113, 98 - 103</td>
<td>Letteri Reading Assignment: Pages 86 - 87</td>
<td>Assignment: Chair #4 – Laser Cut, Roll Formed, Welded, Bent Tube Sheet Metal Chair</td>
<td>Field Trip: Sheet Metal Fab Shop</td>
<td>Quiz: None</td>
<td>Other: Reading Assignment - Mechanics of Materials D2L Handout</td>
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<tr>
<td>7</td>
<td>Lecture Topic: Extrusion</td>
<td>Thompson Reading Assignment: None</td>
<td>Letteri Reading Assignment: Pages 78 - 83</td>
<td>Assignment: Chair #5 – Extruded Slat Chair</td>
<td>Field Trip: None</td>
<td>Quiz: None</td>
<td>Other: Reading Assignment - Mechanics of Materials D2L Handout, Video Viewing – Extrusion TBD</td>
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<tr>
<td>8</td>
<td>Lecture Topic: Thermoforming / Pressure Forming</td>
<td>Thompson Reading Assignment: Pages 30 - 35</td>
<td>Letteri Reading Assignment: Pages 53 - 56</td>
<td>Assignment: Chair #6 – Pressure Formed Chair</td>
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<td>Date</td>
<td>Lecture Topic</td>
<td>Thompson Reading Assignment</td>
<td>Lefteri Reading Assignment</td>
<td>Assignment</td>
<td>Deadline</td>
<td>Field Trip</td>
<td>Quiz</td>
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| 9     | Deadline: Chair #5 – Extruded Slat Chair (LO 1-10)  
Field Trip: Pressure Former  
Quiz: None  
Other: None |                              |                            |                                 |                                |                                |                                          |                                          |
Thompson Reading Assignment: Pages 120 - 135  
Lefteri Reading Assignment: Pages 202 - 203  
Assignment: Chair #7 – Sand Cast Aluminum Chair (LO 1-10)  
Deadline: Chair #6 – Pressure Formed Chair  
Field Trip: Aluminum Foundry, and Design2Part Show (3/21, 3/22)  
Quiz: Mid-term: Metal (primarily Sheet Metal) |                            |                                 |                                |                                |                                |                                          |                                          |
| 10    | Holiday No Class  
T 3/29 R 3/31 | Lecture Topic: Rotational Molding  
Thompson Reading Assignment: Pages 36 - 39  
Lefteri Reading Assignment: Pages 119 - 121  
Assignment: Chair #8 - Rotational Molded Chair  
Deadline: Chair #7 – Sand Cast Aluminum Chair (LO 1-10)  
Field Trip: None  
Quiz: None  
Mid-Term: Mid-term Binder Review  
Other: Video Viewing – Rotational Molding |                            |                                 |                                |                                |                                |                                          |                                          |
| 11    | T 4/5 R 4/7                    | Lecture Topic: Reaction Injection Molding (RIM)  
Thompson Reading Assignment: Pages 64 - 67  
Lefteri Reading Assignment: Pages 181 - 184  
Assignment: Chair #9 - Reaction Injection Molded (RIM) Chair  
Deadline: Chair #8 - Rotational Molded Chair (LO 1-10)  
Field Trip: Reaction Injection Molder  
Quiz: None  
Other: None |                            |                                 |                                |                                |                                |                                          |                                          |
| 12    | T 4/12 R 4/14                  | Lecture Topic: Injection Molding I  
Thompson Reading Assignment: Pages 50 - 63  
Lefteri Reading Assignment: Pages 178 - 180  
Assignment: Chair #10 – Evaluation of Plastic Patio Chair  
Deadline: Chair #9 - Reaction Injection Molded (RIM) Chair (LO 1-10)  
Field Trip: Injection Molder  
Quiz: None  
Other: None |                            |                                 |                                |                                |                                |                                          |                                          |
| 13    | T 4/19 R 4/21                  | Lecture Topic: Injection Molding II  
Thompson Reading Assignment: None  
Lefteri Reading Assignment: None |                            |                                 |                                |                                |                                |                                          |                                          |
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<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Lecture Topic</th>
<th>Assignment</th>
<th>Deadline</th>
<th>Field Trip</th>
<th>Quiz</th>
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<tbody>
<tr>
<td>14</td>
<td>T 4/26</td>
<td>Review of Materials and Processes</td>
<td>Chair #11 - Injection Molded Chair</td>
<td>Chair #10 – Evaluation of Plastic Patio Chair (LO 1-10)</td>
<td>None</td>
<td>Final Exam: Plastics (Primarily Injection Molding)</td>
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<td>R 4/28</td>
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<td>15</td>
<td>T 5/3</td>
<td>Review of Materials and Processes</td>
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<td>Final Exam: Plastics (Primarily Injection Molding)</td>
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<td>R 5/5</td>
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<td>16</td>
<td>T 5/10</td>
<td>Review of Materials and Processes</td>
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<td>Grade Plastics quiz in class</td>
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<td>R 5/12</td>
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<tr>
<td>Final Exam</td>
<td>R 5/19</td>
<td>41 Post Mortem, Introduction to DSID 143</td>
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<td>Digital Copy of Materials and Processes Binder</td>
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<td></td>
<td>7:15 AM – 9:30 AM</td>
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<td>Make up exam date if needed is TBD</td>
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