CrewAI Agent-Based Model Design - Instructions

LEAD 352 – Check In 2

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## 0.1 Team Information

**Team Name:** Andy’s Playland

**Team Members:**

1. Andy Zheng (GitHub Username: PigZapper)
2. Colin Buchbinder (GitHub Username: ColinBuchbinder)
3. Kevin Mroczka(GitHub Username: KevinMroczka)
4. Christopher Ribaric (GitHub Username: cribaric)
5. Aidan Stappenbeck (GitHub Username: aidanstapp)
6. Andrew Zinzi (GitHub Username: AndrewZinzi

**GitHub Repository URL:** https://github.com/PigZapper/LEAD-352

## 0.2 Project Overview

In this assignment, you will design a complete CrewAI agent-based simulation. You’ll write the actual implementation code for the key components that could be executed in the future.

Describe your overall simulation concept (what problem is your agent-based model addressing?):

In our model we are attempting to find how the big 5 personality traits affect a team. Specifically, how each trait impacts a team in a leadership role using an escape room as the grounds for testing

0.3 Setup and Imports

LEAVE THIS SECTION AS IT IS other than team name (you will use this in your code to start):

#!/usr/bin/env python3  
"""  
CrewAI Agent-Based Model Design  
  
Team: Andy’s Playland  
"""  
  
# Import necessary libraries  
from crewai import Agent, Task, Crew, Process  
from langchain\_community.llms import Ollama  
# Add any other imports you need  
  
# Define the language model that will power your agents  
llm = Ollama(model="llama2")

## 0.4 Agent Definitions

Define your agents with distinct roles, goals, and backstories. You need at least 3 agents, but can create more if needed.

### 0.4.1 Agent 1

# Define your first agent  
Openness\* Leader = Agent(  
 role="Leader", # The agent's function or position in the team  
 goal=" Create a plan for the task using Openness\*, lead the team and take charge to escape the room as fast as possible ", # What the agent aims to accomplish  
 backstory=" You are a natural leader, you use your Openness\* to guide your team to complete the escape room. ",

# Background information that shapes the agent's approach  
 verbose=True,  
 llm=llm  
)  
# \*Rotating (Openness, Conscientiousness, Extroversion, Agreeableness, Neuroticism)  
# Explain this agent's personality traits and other characteristics:

### 0.4.2 Agent 2

# Define your second agent  
 Team Member = Agent(  
 role=" Extroversion Team Member ",  
 goal=" Be a vocal member in trying to determine how to escape the room",  
 backstory=" You have an extraverted personality type and talk over other members sometimes even as a team member.",  
 verbose=True,  
 llm=llm  
)  
  
# Explain this agent's personality traits and other characteristics:

### 0.4.3 Agent 3

# Define your third agent  
 Team Member = Agent(  
 role="Conscientiousness Team Member",  
 goal='Be the logical team member that tries to think through every step before acting, be very careful',  
 backstory=" You like to make sure the team follows the rules and goes by the book in terms of escaping the room .",  
 verbose=True,  
 llm=llm  
)  
  
# Explain this agent's personality traits and other characteristics:

### 0.4.4 Additional Agents (Optional)

# Define additional agents as needed  
 Team Member= Agent(  
 role="Agreeableness Team Leader",  
 goal="Be the one who agrees with the rest and/or the leader even if it goes against your persona; opinion",  
 backstory="You are a member of a team that ensures team cohesion, is kind and considerate but wants to avoid conflict",  
 verbose=True,  
 llm=llm  
)

Team Member = Agent(

role='Neurotic Team Member',

goal='Be the neurotic team member that suffers from anxiety and depression',

backstory='You are a bipolar, anxious and get overwhelmed easily.',

llm=custom\_llm

)

Team Member = Agent(

role=’Openness Team Member’,

goal='Listen to every team members ideas, always be ready to try something new',

backstory='You are open to all new ideas and approach things with an open mind, no judgement .',

llm=custom\_llm

)  
# Explain this agent's personality traits and other characteristics:

## 0.5 Task Definitions

Define the tasks that your agents will perform. Create at least one task for each agent.

### 0.5.1 Task 1

# Define your first task  
leader\_task = Task(

description='Lead the group of team members based on your personality type, use your personality type to escape the room as fast as possible', expected\_output='Lead team to escape the room as fast as possible.',

agent= leader

)

# Explain any dependencies this task has:

### 0.5.2 Task 2

# Define your second task  
time\_task = Task(

description='Effectively keep time of how long the group is taking on each stage of the escape room',

expected\_output='A time total for how long the group takes to escape the room',

agent=Neurotic team member

)  
# Explain any dependencies this task has:

### 0.5.3 Task 3

# Define your third task  
relay\_task = Task(

description='Help relay information that one team member finds to other team members so that they can work together and think of new ideas to escape the room',

expected\_output='effectively communicate clues that were found to the group and explain how they can use them to potentially escape as quick as possible',

agent=Extraversion Team Member

)

# Explain any dependencies this task has:

### 0.5.4 Task 4

# Define additional tasks as needed  
puzzle\_task = Task(

description='If there are any puzzles or creative tasks, they will be your responsibility to solve with minimal help from the team',

expected\_output=’solve puzzle or creative tasks with help from Openness Team Member to escape the room as quick as possible ’,

agent=Conscientiousness Team Member

)  
# Explain any dependencies this task has:

# Task 5

creative\_task = Task(

description='Think of how to solve creative tasks with Conscientiousness Team Member, but also how the group can use certain clues to help them escape the room in a creative way.',

expected\_output='solve creative problems and use clues to creatively escape the room as quick as possible',

agent=Openness Team Member

)

#Task 6

cohesion\_task = Task(

description='Help maintain relationships among team members and ensure that everyone is working together effectively in order to escape the room',

expected\_output='Maintain relationships and cohesion among the group to escape the room as quick as possible ',

agent= Agreeableness Team Member

)

## 0.6 Process Flow Design

### 0.6.1 Crew Setup

# Set up your crew with the defined agents and tasks  
# Create the crew with sequential processing and verbose output

crew = Crew(

agents=[leader, extraversion team member, conscientiousness team member, agreeableness team member, neurotic team member, openness team member],

tasks=[leader\_task, time\_task, relay\_task, puzzle\_task, creative\_task, cohesion\_task],

# will remove corresponding team member with whoever the leader is depending on the current simulation

process='simultaneous', # Agents work at once alongside one another

verbose=True # Prints detailed logs of agent interactions

)# Start the collaboration and execute the tasks

result = crew.kickoff()

# Print the final output

print("Final Output:", result)

# Explain why you chose this process type:

### 0.6.2 Workflow Diagram

Sketch or describe the workflow of your simulation (how tasks and agents interact):

The agents interact with the tasks during the escape room process because each agent has a specific task both when they are a leader and just a team member.

## 0.7 Implementation Considerations

### 0.7.1 Challenges

What challenges do you anticipate in implementing this simulation?

Due to the many inputs and outputs, we are presenting the simulation, there are many points in which the program can break and as such we would need to adjust our scope to match the ability of what can be run. I also see that there could be an unforeseen point in that would make the five separate trials have more than just the leader change between them causing an uncontrolled variable that would impact results.

### 0.7.2 Future Enhancements

Describe potential future enhancements to your simulation:

I foresee the need to detail what tasks specify we want our agents to do as we have given them a description of their task rather than a step-by-step process that they must do otherwise they fail.

## 0.8 Submission Checklist (confirm these are completed)

* Completed all required agent definitions (minimum 3)
* Created at least one task for each agent
* Designed the process flow and team structure
* Considered implementation challenges and future enhancements

# 1. Overview

In this assignment, you will design a complete CrewAI agent-based simulation. You’ll write the actual implementation code for the key components while focusing on thoughtful design of agents, tasks, and their interactions.

# 2. Assignment Purpose

The purpose of this assignment is to:

1. Demonstrate your understanding of agent-based modeling concepts
2. Gain hands-on experience with the CrewAI framework’s code structure
3. Design a well-thought-out simulation with multiple agents and tasks
4. Practice writing code that defines agent personalities and behaviors

# 3. Assignment Components

## 3.1 1. Setup and Imports

Your code should include the proper imports (LEAVE THIS AS IS FOR NOW):

from crewai import Agent, Task, Crew, Process  
from langchain\_community.llms import Ollama  
  
# Set up the language model  
llm = Ollama(model="llama2")

## 3.2 2. Agent Definitions

Define at least 3 agents for your simulation. For each agent, implement the Agent class with:

agent = Agent(  
 role="", # The agent's function or position  
 goal="", # What the agent aims to accomplish  
 backstory="", # Background that shapes perspective  
 verbose=True,  
 llm=llm  
)

Focus on creating distinctive personalities by crafting detailed backstories and clear goals that would influence how the agent would approach its tasks.

## 3.3 3. Task Definitions

For each agent, define at least one task using the Task class:

task = Task(  
 description="", # What the task involves  
 expected\_output="", # The desired result  
 agent=agent, # Which agent performs this task  
 context="" # Optional additional information  
)

Be specific about what each task involves and what output it should produce. Consider any dependencies between tasks (e.g., if one task needs the output from another).

## 3.4 4. Crew Setup

Define your crew, which organizes your agents and tasks:

crew = Crew(  
 agents=[agent1, agent2, agent3],  
 tasks=[task1, task2, task3],  
 verbose=2,  
 process=Process.sequential # or Process.hierarchical  
)

Explain your choice of process type (sequential or hierarchical) and how it suits your simulation.

# 4. Grading Criteria

Your submission will be evaluated on:

* **Agent Design**
* **Task Design**
* **Process Flow**

# 5. Submission Requirements

Submit your completed worksheet as a Word document by **[DEADLINE DATE]**.

# 6. Example Agent Definition

financial\_advisor = Agent(  
 role="Financial Planning Specialist",  
 goal="Develop comprehensive financial plans tailored to clients' needs and goals",  
 backstory="""You are an experienced financial advisor with over 15 years in the industry.  
 You have helped hundreds of clients achieve financial security through careful planning   
 and strategic investment advice. You have certifications in financial planning and   
 retirement planning. You take a conservative approach to risk but understand that some   
 calculated risks are necessary for growth. You pride yourself on explaining complex   
 financial concepts in simple, understandable terms.""",  
 verbose=True,  
 llm=llm  
)

# 7. Example Task Definition

create\_financial\_plan = Task(  
 description="""Create a comprehensive financial plan for a middle-aged couple with two   
 children planning for retirement and college expenses. Include investment recommendations,   
 savings strategies, risk management, and a timeline for implementation. Consider their   
 current assets, income, and future financial goals.""",  
 expected\_output="""A detailed financial plan document with sections for retirement planning,   
 college funding, investment strategy, risk management, and implementation timeline. The plan   
 should include specific investment recommendations, monthly savings targets, insurance needs,   
 and key milestones.""",  
 agent=financial\_advisor,  
 context="""The clients are: John (45) and Mary (43) with children ages 12 and 14. Combined   
 annual income: $175,000. Current savings: $250,000 in 401(k)s, $50,000 in college funds,   
 $30,000 emergency fund. They want to retire at 65 with $2M and fully fund their children's   
 public university education."""  
)

# 8. Resources

* CrewAI Documentation: https://docs.crewai.com/
* CrewAI GitHub Repository: https://github.com/joaomdmoura/crewAI