M20HSS316-ITP/Assignment-1/20171047/CLD

- Using symbolism: $A_1 \wedge A_2 \wedge \ldots \wedge A_n :: B \equiv B$ can be inferred from A_1 thru A_n
- Using '::' such that it is not confused with the colon ':'

(1)

To start things off, let's jot down the presented argument in its crude natural state.
Argument Rhetoric:

Question: What do you do with witches?
Answer: Burn.
Question: What burns apart from witches?
Answer: Wood.
Question: Why do witches burn?
Answer: Because they are made of wood.
Question: How do we tell whether she is made of wood?
Answer: A piece of wood floats in water. A duck also floats in water. If a woman weighs the same as a duck, she is made of wood and is therefore a witch.

Looking at it at a glance, the structure seems to make absolutely no sense and is framed in a manner designed to take the hearer for a spin. Now, let's dissect it further into a set of premises.

P1: Witches are burned
P2: If something is made up of wood, then it can be burnt
R: Witches are made up of wood.

Let us take a pause here. Clearly, P1 and P2 collectively do not imply R. The key here is in noting that P2 is not a biconditional i.e to say if something can be burnt, then it is essentially made out of wood. Thus, in order to proceed further, we need to relax P2 into $P2^R$ as:

$P2^R$: If and only if something is made up of wood, then it can be burnt
Now $P2^R$ and P1 imply R, is a valid argument. Adding the additional bits:

P3: A piece of wood floats on water
P4: A duck floats on water
P5: If a woman weighs the same as a duck, then she is made up of wood

Note that P5 has to be regarded as a conditional premise (and not a conclusion) because:

1. It cannot be derived from premises 1 thru 4
2. It is not a universally accepted truth

- Also, we can safely ignore P3 and P4 as rhetoric. P5 is a standalone premise in the form of a conditional. We are not questioning the soundness of premises here.

P6: The woman weighs the same as a duck.

C: The woman is a witch; C being the conclusion that was reached in the argument.

Now, the argument: R, P5, P6 implying C - is not valid. In modus ponens form, P6 and P5 collectively imply: The woman is made up of wood. This does not necessarily imply that the woman is a witch. We only know that a witch is a woman who is made up of wood (R inferred from P1 and $P2^R$), however, we have nothing telling us that all women made up of wood are witches. Thus, the argument is not valid.

We need to rearrange and reframe the argument in order to make it valid. This will require brute force and making some underlying assumptions none of which will be sound (or sane) in nature. But just for the sake of it, we can squeeze the structure into a valid form with a set of minor changes.

P0: Normal women are not made out of wood
P1: A witch is a woman who is burned
$P2^R$: If and only if something is made out of wood, then it can be burnt
P3: If a woman weighs the same as a duck, then she is made up of wood
P4: The woman weighs the same as a duck

$P1 \wedge P2^R :: R$ (Witches are made out of wood)
$P0 \wedge R :: S$ (If a woman is made out of wood, then she must be a witch)
$P4 \wedge P3 :: P5$ (The woman is made out of wood)
$P5 \wedge S :: C$ (The woman is a witch)

- is a valid argument structure (it is not sound)

(2)

Reformulating the passage in the form of premises (we can also ignore the final sentence as it is simply rhetorical and a reiteration of previously made statements):

P1: Philosophy teaches critical thinking skills which are applicable in every career.
P2: Compared to Philosophy, coding is a narrow skill.
P3: Coding is only of value to people who wish to pursue a career in the tech industry.
P4: Philosophy should be a part of every students' curriculum.
P5: Coding need not be a part of every students' curriculum.
P6: If a person X argues that Philosophy should not be taught but coding should be, then X is making an uninformed statement

Supplying implicit and suppressed premises:
Q1: If a discipline or subject is applicable in every career, then it should be taught to every student
Q2: If a discipline or subject is not applicable in every career, then it need not be taught to all students

- Note that Q2 is the inverse of Q1

Q3: If P is a valid conclusion based on a set of premises AND a person X claims that (NOT P) is true, then X is making an uninformed claim

Now, we can write out the main argument as:
P1 ∧ Q1 :: P4
P2 ∧ P3 ∧ Q2 :: P5
Now, P4 and P5 are valid conclusions from premises (P1, Q1) and (P2, P3, Q2) respectively.

Therefore: add premise Q4: If A and B are valid conclusions from well-defined premises and all conditions remaining unaltered, then A OR B is also valid

Now,
P4 ∧ P5 ∧ Q4 :: P4 OR P5

If we have the premise: Q5: A person 'Z' has claimed NOT P4 AND NOT P5 a
And our desired conclusion is C: 'Z' has made an uninformed claim.
Q5 can be re-written as 'A person 'Z' has claimed NOT (P4 OR P5)' by De-Morgan's Law and Involution Law.
We have the final conclusion:
Q5 ∧ P4 OR P5 ∧ Q3 :: C

Thus, under the addition of these premises, the final conclusion based on the collection of premises is valid. It is however not sound.

Now, the weakest link can be analyzed in two ways. Firstly, without considering background knowledge, i.e to say, we only consider structural integrity of the argument. Secondly, we question the soundness given the validity holds.

If you look at the premises; P1, P3, P4, P5 are all well-defined in nature. Concepts of all, one, & none are all well defined in propositional logic. In P2, coding is considered to be a narrow skill. Now, the definition of narrow itself is questionable and this is a weak point in the argument structure. An easy counter here can be along the lines of clarity specification for narrowness. The premises of the form Q*n* are all well structured.

Coming to soundness, coding teaches you to think logically and structurally. You are automatically learning how to handle edge cases, how to deal with exceptions, how to lay out definitions in a robust and fault tolerant fashion. Programming languages might change but the rational and algorithmic thinking which goes behind learning how to code lingers on and its benefits go well beyond the tech domain.

Thus, P2 and P3 would be weakest links in the argument flow judging based on structure and semantics alike.