Language Processing Project

This Notebook presents the created simple Application and summarises its algorithmic steps.

Parameters are given as an input to the Application.

Given document paths and their focussed page intervals (excluding cover pages, content parts, terms and conditions, legal warnings, drawing pages etc.) can be retrieved easily from a local database storing the scope of technical specifications.

The variable, phrase is the input coming from the human user as a typing action such as interaction with a chatbot.

In [1]:

```
document = "_inputs/S3 Tool Changer.pdf"
page_start = 5
page_end = 14
phrase = 'tooling adaptor'
```

Document processing is performed as plain text and tables extraction separately.

In [2]:

```
%run _functions_rev2.ipynb
document_components = document_processing(document, page_start, page_end)
print(document_components.keys())
list(document_components.values())[1]
```

```
dict_keys(['text', 'tables'])
```

```
Out[2]: [[{'table': [[None, 'Cleanroom', 'Non-Cleanroom'],
            ['Metal to Metal Parts',
             'Apiezon L or Equivalent',
             'White lithium Grease'],
            ['O-Rings', 'Apiezon L or Equivalent', 'Parker Lube-A-Cyl Lubricant']],
          'doctop': 183.64499999999995}],
         [{'table': [['Specifications', 'Robot Adaptor', 'Tool Adaptor'],
            ['', '', ''],
            ['Model Code', 'S3R-21.05-PG', 'S3T-21.05-PG'],
            ['', '', ''],
            ['Payload', '350 kg', None],
            ['', '', None],
            ['Moment Mx, My', '15000in/lbs, 1695 Nm', None],
            ['', '', None],
            ['Moment Mz', '15750 in/lbs, 1780 Nm', None],
            ['', '', None],
            ['Height', '107mm', '60mm'],
            ['Weight', '16.5 lbs, 7.34 kg', '11.2 lbs, 5.13 kg'],
            ['Couple/Uncouple', '“ BSPP', '“ BSPP'],
            ['Port', '', ''],
            ['Repeatability X,Y', '0.04 mm', None],
            ['', '', None],
            ['Repeatability Z', '0.04 mm', None],
            ['', '', None],
            ['Operating Temp.', '5 60 Deg C', None],
            ['', '', None],
            ['Operating', '6 bar + 1 (87 + 15 psi)', None],
            ['Pressure', '', None],
            ['Couple Uncouple', '“ ⁙ BSPP', None],
            ['Ports Sizes', '', None]],
          'doctop': 86.63999999999999}]]
```

Extracted text is handled with a Natural Language Processing Python Package to extract further the sentences in interest for the given phrase.

```
In [3]: text = list(document_components.values())[0]
        sentencesOfInterest = sentence_catcher(text, phrase)
```

Ontology transformation is performed for each extracted sentence by means of the conceptualisation developed during the meetings.

```
In [4]: formalisedStructure = ontology_transformer(sentencesOfInterest)
```

After the transformation the sentences are saved to a Local Storage/Database with their newly formalised structure.

```
In [5]: fileName = 'formalisedStructure_'+ phrase_namer(phrase) +'.pkl'
        print(fileName)
        with open('_database/'+fileName, 'wb') as f:
            pickle.dump(formalisedStructure,f)
```

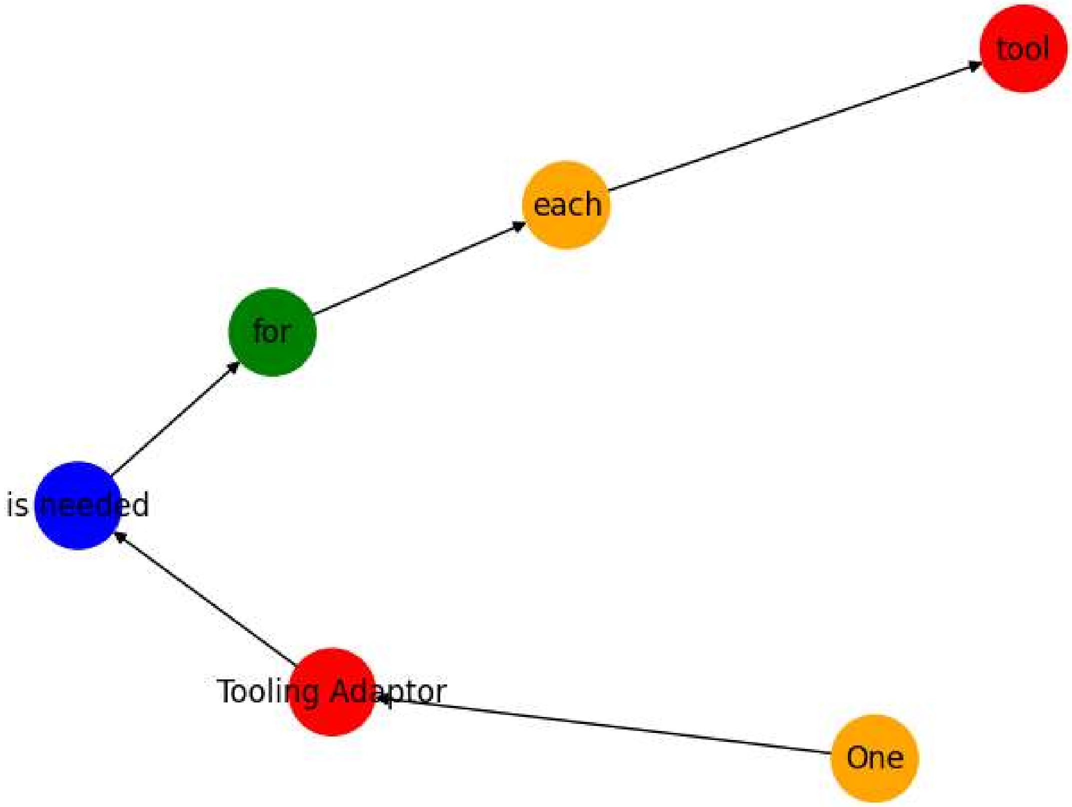
```
formalisedStructure_tooling-adaptor.pkl
```

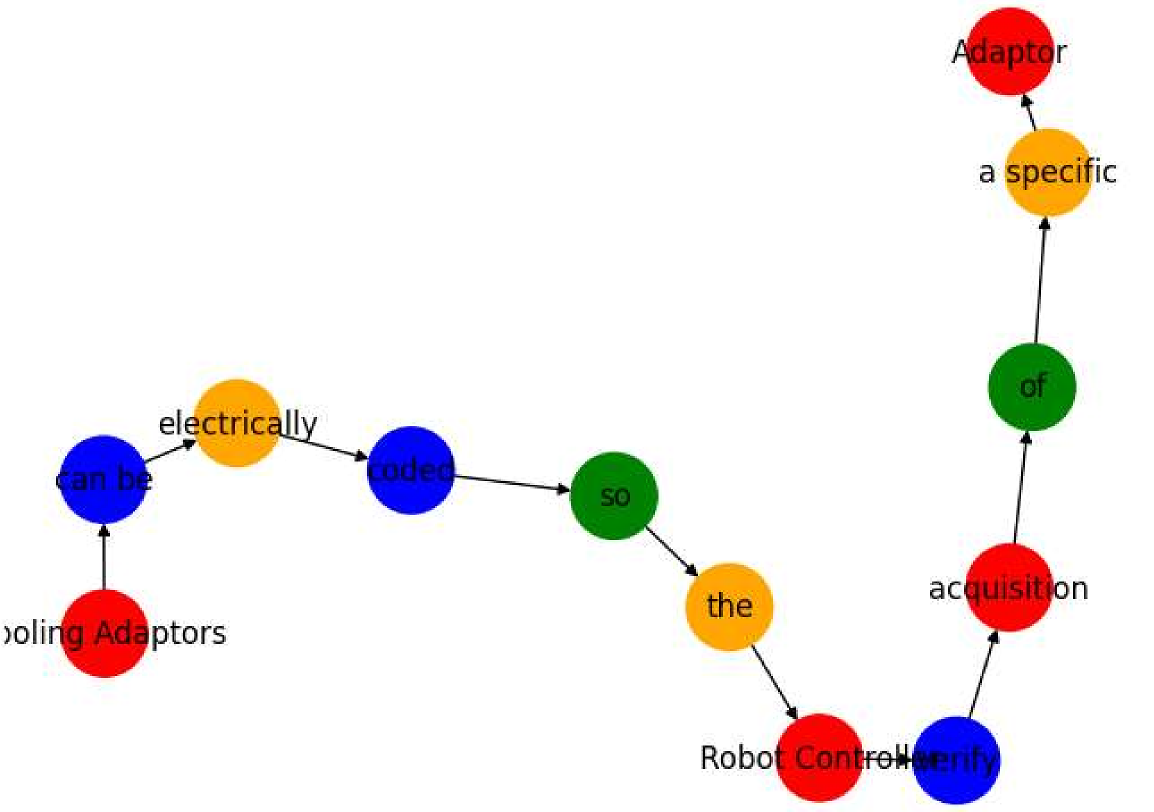
The current version of the Application retrieves formalised structures from the database and generates digraphs.

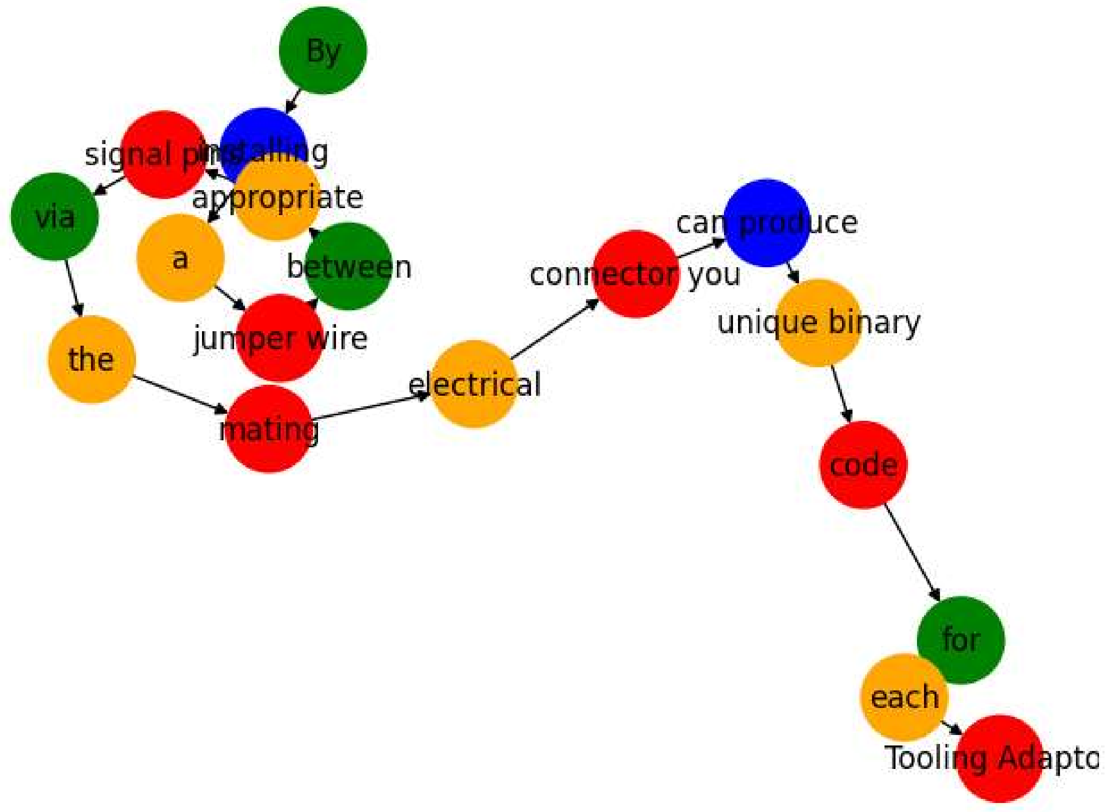
Generation of the network consisting of digraphs is the initial step for obtaining functional requirements and performing data mining from the bulks of sentences and tables stored in the database.

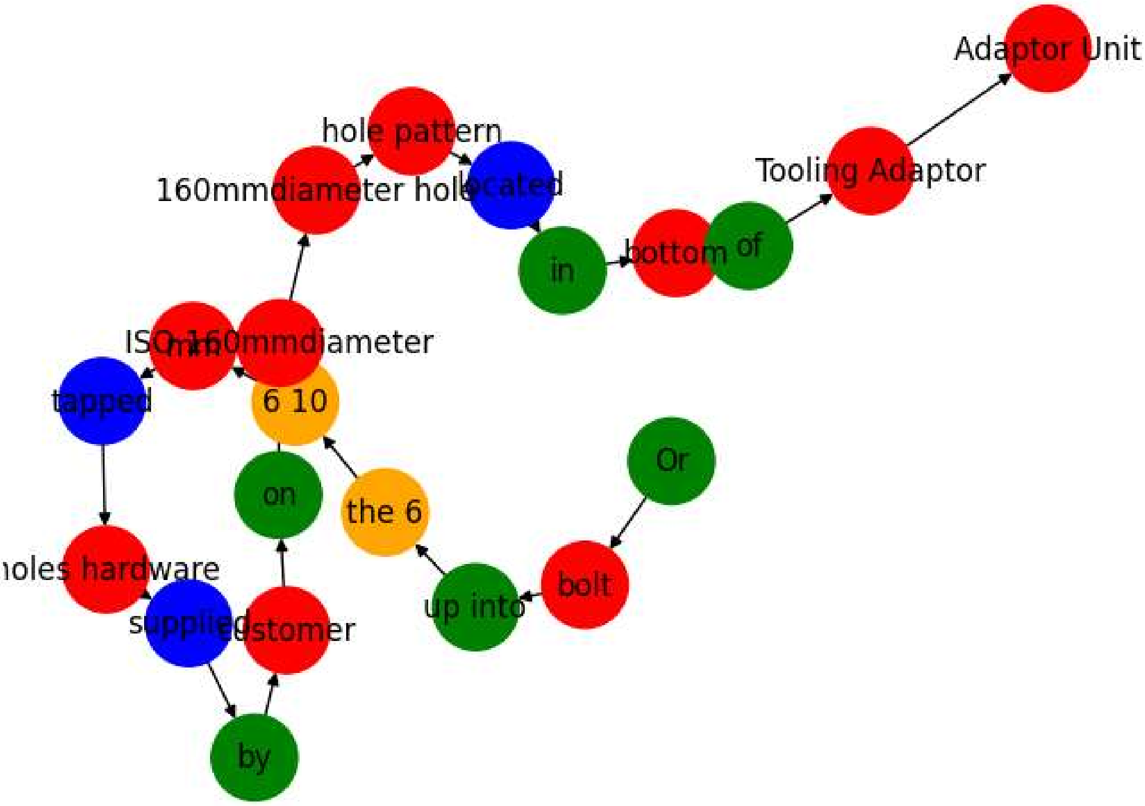
In [1]:

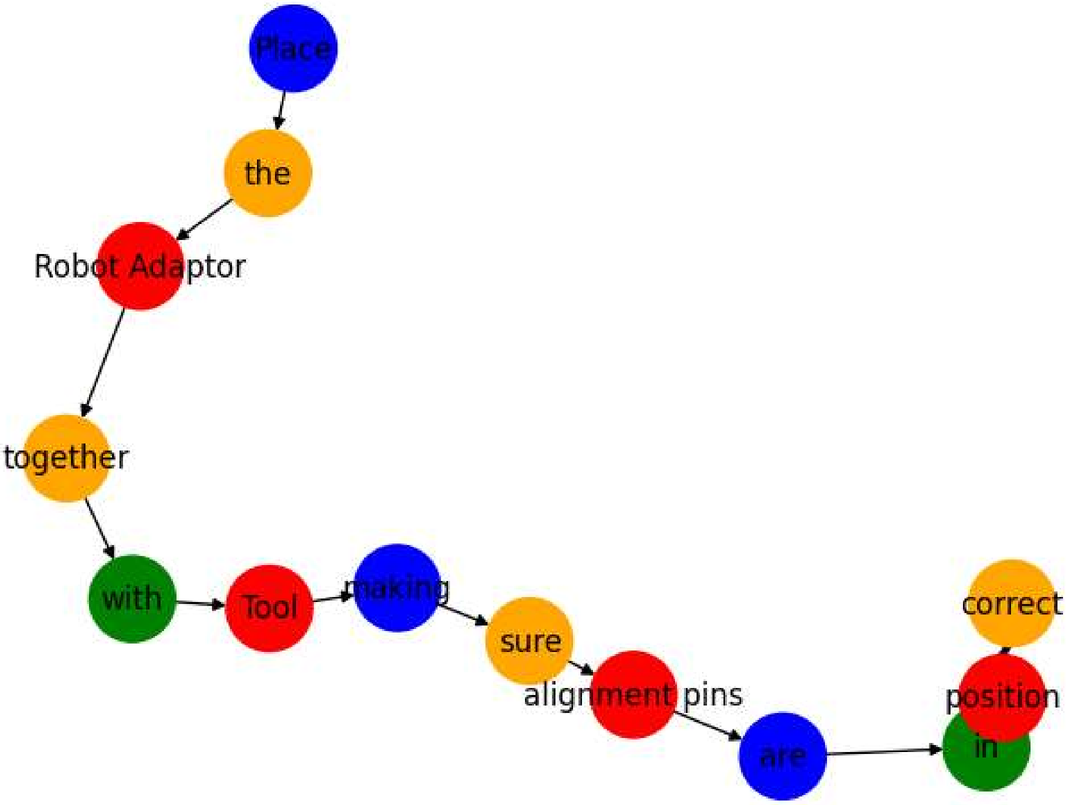
```
%run _functions_rev2_network.ipynb
fileName = 'formalisedStructure_tooling-adaptor.pkl'
with open('_database/'+fileName, 'rb') as f:
    formalisedStructure = pickle.load(f)

for sentence in formalisedStructure:
    graph(sentence)
```

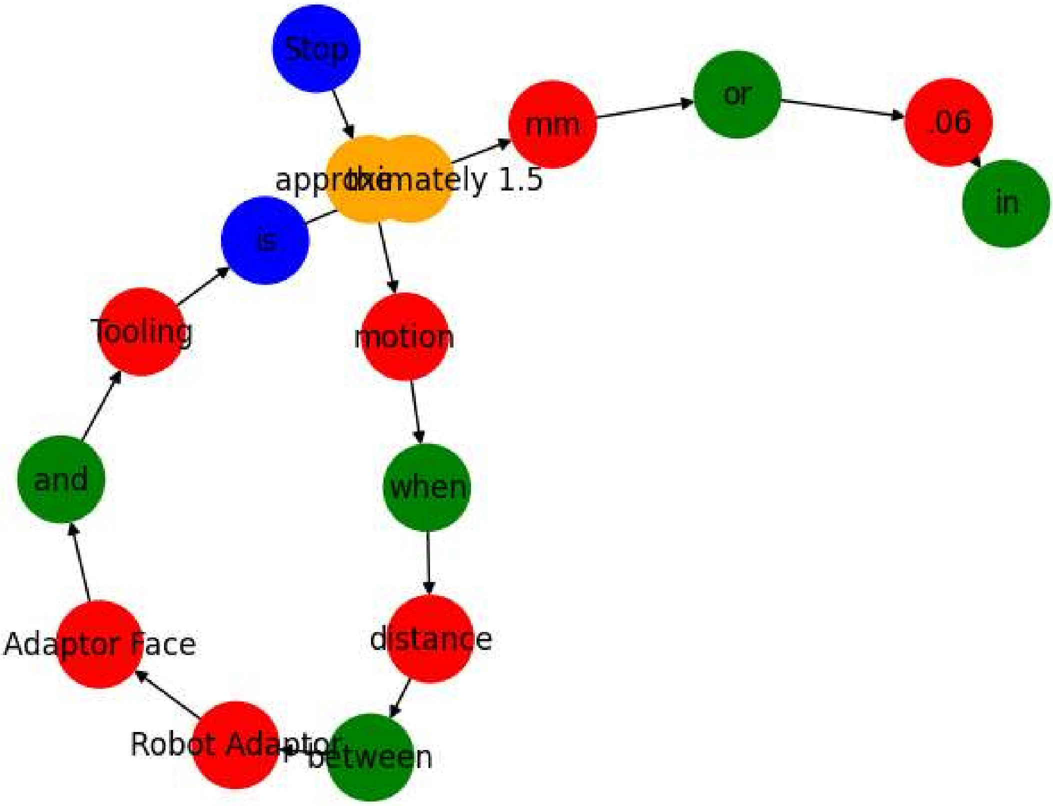


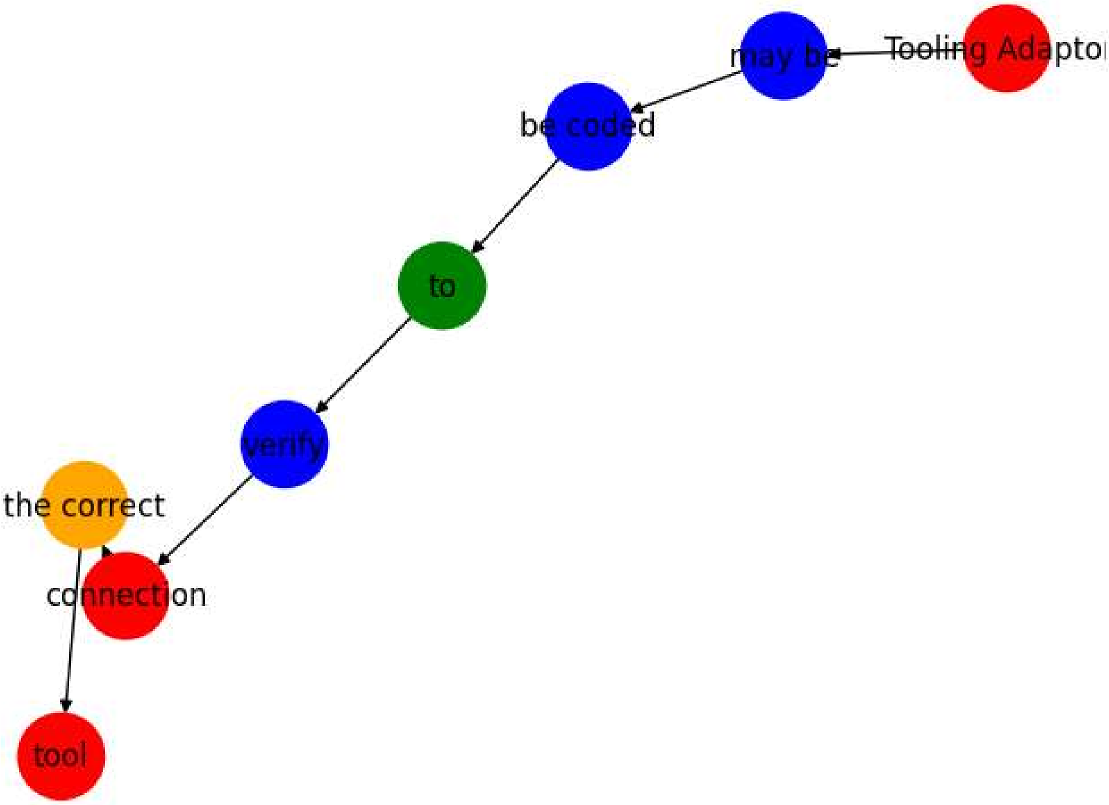

ooling Adaptors
can be
electrically
coded
so
the
Robot Controller
verify
acquisition
of
a specific
Adaptor

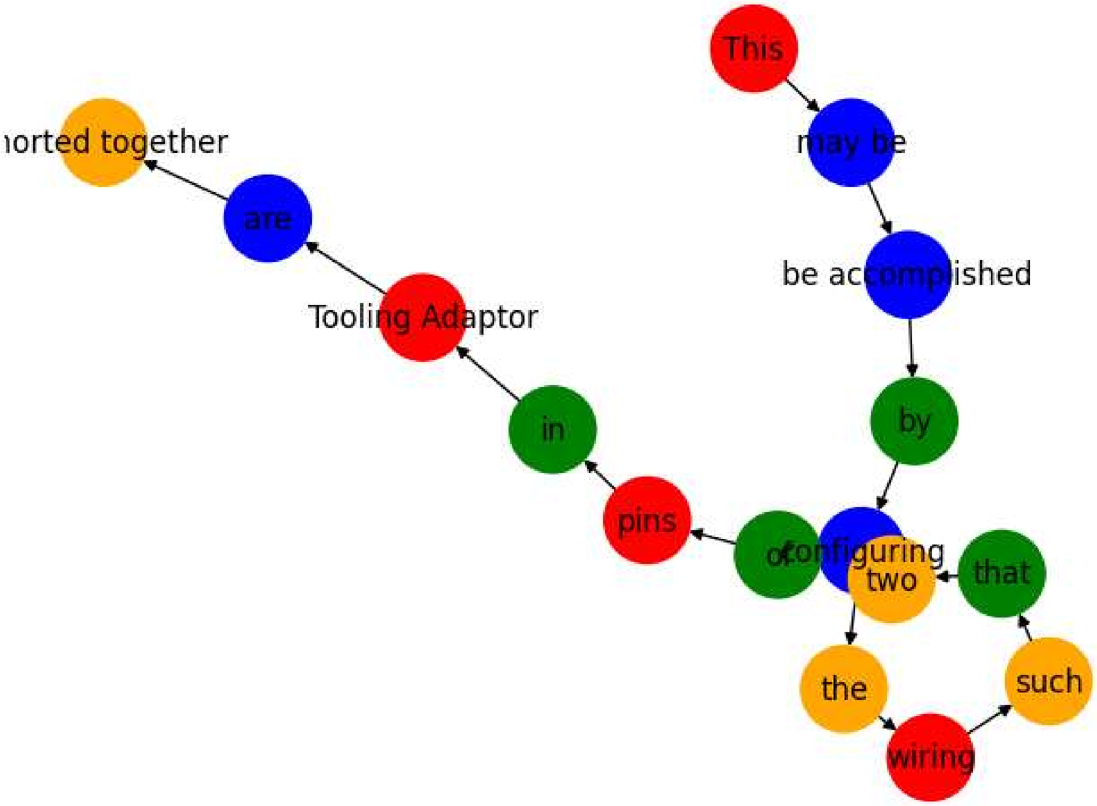

By
installing
a
jumper wire
between
appropriate
signal pins
via
the
mating
electrical
connector you
can produce
unique binary
code
for
each
Tooling Adapto

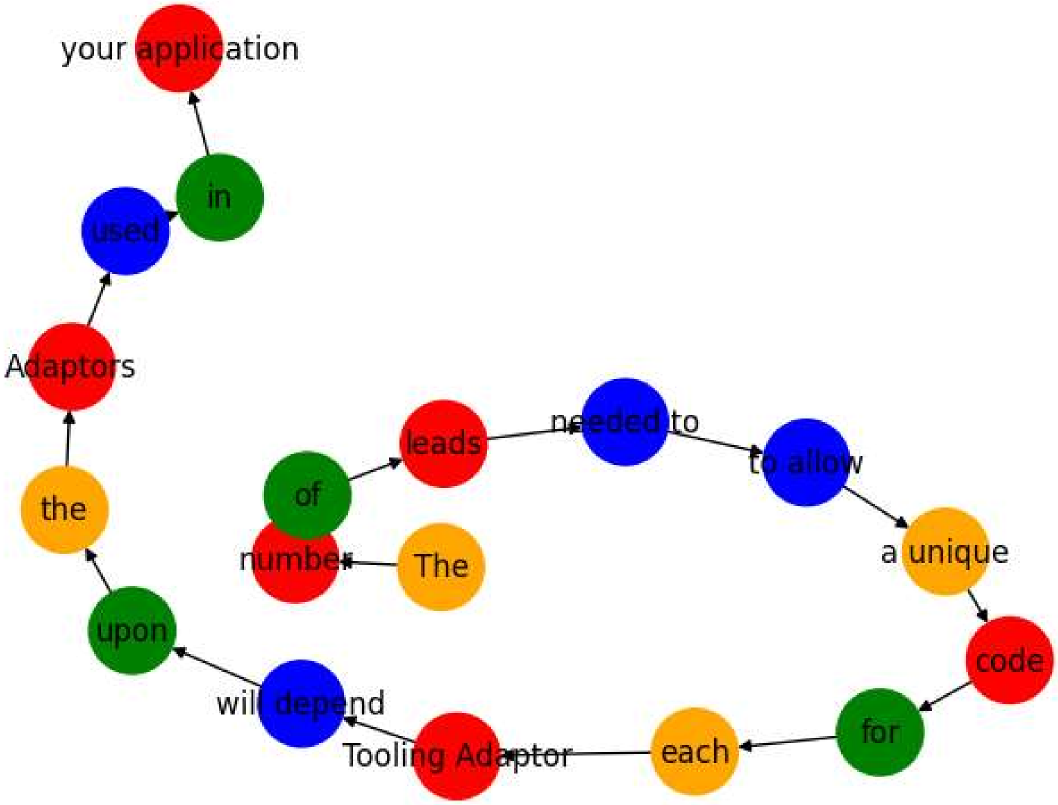

Adaptor Unit
hole pattern
160mmdiameter hole
located
Tooling Adaptor
in
bottom
of
ISO 160mmdiameter
mm
tapped
6 10
on
the 6
Or
bolt
up into
holes hardware
supplied
customer
by


Place
the
Robot Adaptor
together
with
Tool
making
sure
alignment pins
are
in
position
correct


Stop
the
approximately 1.5
mm
or
.06
in
is
Tooling
motion
when
and
distance
Adaptor Face
Robot Adaptor
between


Tooling Adaptor
may be
be coded
to
verify
the correct
connection
tool


This
may be
be accomplished
by
configuring
the
wiring
such
that
two
of
pins
in
Tooling Adaptor
are
horted together


The
number
of
leads
needed to
to allow
a unique
code
for
each
Tooling Adaptor
will depend
upon
the
Adaptors
used
in
your application