به نام خدا

# گزارش فاز اول پروژه سیستم‌های بی‌درنگ

ندا تقی‌زاده ۹۸۱۷۰۷۴۳

ساعی سعادت ۹۷۱۱۰۲۶۳

# فهرست مطالب:

# توضیحات پروژه:

منابع پروژه در [لینک گیت‌هاب](#) قابل مشاهده می‌باشند.

کد پروژه با کیفیت و خوانا پیاده‌سازی شده و کامنت‌گذاری نیز انجام شده. همچنین توضیحات مربوط به نحوه‌ی اجرای برنامه در [README.md](#) قابل مشاهده است.

به صورت کلی، با اجرای اسکریپت main.py و با دادن ۲ آرگومان config file و mode (اختیاری) می‌توانید برنامه را اجرا کنید.

برای قسمت‌های خواسته شده، فایل‌های config آماده در پوشه‌ی configs ایجاد شده ولی می‌توانید حالات مورد نیاز دیگر را نیز پیاده‌سازی کنید و نتایج آن‌را مشاهده کنید. برای اطلاع از ساختار فایل‌های config لطفا به README.md مراجعه فرمایید. در config file های موجود، مقدار seed رندوم نیز تعیین شده تا نتایج قابل تکرار باشند.

آرگومان mode در صورتی که برابر report باشد، در پوشه‌ی reports گزارشات مربوط به اطلاعات تسک‌ها و همچنین نتیجه‌ی نگاشت آن‌ها به هسته‌های پردازشی را ایجاد می‌کند. فایل گزارش ایجاد شده با فرمت {config_main_name}-{assignment_method}-[assignment/tasks]-report.csv

قابل مشاهده است. جداول به‌دست آمده در ادامه‌ی این مستند قابل مشاهده است. همچنین در پوشه‌ی reports روی ریپازیتوری پروژه موجود هستند.

در جداول مربوط به نگاشت وظایف، در انتهای وظایف مربوط به هر هسته یک ردیف نهایی وجود دارد که مجموع مقدار utilization آن هسته را نمایش می‌دهد.

# حالت اول:

۸ هسته، بهره‌وری ۰.۵ و نسبت برابر LC و HC

## تسک‌ها:

| Task Name | Period | Criticality | WCET-HI | WCET-LO | Utilization |
|-----------|--------|-------------|---------|---------|-------------|
| T1-HC | 200 | HC | 182.88263543073800 | 75.9823270084509 | 0.91441317715369100 |
| T2-HC | 20 | HC | 1.26332820700150000 | 0.3905767093885820 | 0.06316641035007510 |
| T3-HC | 50 | HC | 10.51099331164120 | 4.7784412253866500 | 0.21021986623282400 |
| T4-HC | 20 | HC | 1.973150043959840 | 0.9294790529520840 | 0.09865750219799190 |
| T5-HC | 20 | HC | 3.314387494531620 | 1.2462933696821500 | 0.16571937472658100 |
| T6-LC | 500 | LC | 183.78567208707300 | | 0.3675713441741460 |
| T7-LC | 200 | LC | 3.94317831480322000 | | 0.019715891574016100 |
| T8-LC | 40 | LC | 33.25052826106890 | | 0.8312632065267230 |
| T9-LC | 200 | LC | 119.09207913219400 | | 0.5954603956609690 |
| T10-LC | 200 | LC | 146.76256628059700 | | 0.733812831402984 |

## نگاشت تسک‌ها با استفاده از WFD:

| Core Name | Task Name | Period | WCET | Utilization |
|-----------|-----------|--------|------|-------------|
| CPU_0 | T1-HC | 200 | 182.88263543073800 | 0.91441317715369100 |
| CPU_0 | | | | 0.91441317715369100 |
| CPU_1 | T3-HC | 50 | 10.510993311641200 | 0.21021986623282400 |

| Core Name | Task Name | Period | WCET | Utilization |
|---|---|---|---|---|
| CPU_1 | | | | 0.21021986623282400 |
| CPU_2 | T5-HC | 20 | 3.314387494531620 | 0.16571937472658100 |
| CPU_2 | | | | 0.16571937472658100 |
| CPU_3 | T4-HC | 20 | 1.973150043959840 | 0.09865750219799190 |
| CPU_3 | T7-LC | 200 | 3.9431783148032200 | 0.019715891574016100 |
| CPU_3 | | | | 0.11837339377200800 |
| CPU_4 | T2-HC | 20 | 1.2633282070015000 | 0.06316641035007510 |
| CPU_4 | T6-LC | 500 | 183.78567208707300 | 0.3675713441741460 |
| CPU_4 | | | | 0.4307377545242210 |
| CPU_5 | T8-LC | 40 | 33.25052826106890 | 0.8312632065267230 |
| CPU_5 | | | | 0.8312632065267230 |
| CPU_6 | T10-LC | 200 | 146.76256628059700 | 0.733812831402984 |
| CPU_6 | | | | 0.733812831402984 |
| CPU_7 | T9-LC | 200 | 119.09207913219400 | 0.5954603956609690 |
| CPU_7 | | | | 0.5954603956609690 |

## نگاشت وظایف با استفاده از FFD:

| Core Name | Task Name | Period | WCET | Utilization |
|---|---|---|---|---|
| CPU_0 | T1-HC | 200 | 182.88263543073800 | 0.9144131771536910 |
| CPU_0 | T2-HC | 20 | 1.2633282070015000 | 0.06316641035007510 |
| CPU_0 | T7-LC | 200 | 3.9431783148032200 | 0.019715891574016100 |
| CPU_0 | | | | 0.9972954790777830 |
| CPU_1 | T3-HC | 50 | 10.510993311641200 | 0.21021986623282400 |
| CPU_1 | T5-HC | 20 | 3.314387494531620 | 0.16571937472658100 |
| CPU_1 | T4-HC | 20 | 1.973150043959840 | 0.09865750219799190 |
| CPU_1 | T6-LC | 500 | 183.78567208707300 | 0.3675713441741460 |

| | | | | |
|---|---|---|---|---|
| **CPU_1** | | | | 0.842168087331542 |
| **CPU_2** | T8-LC | 40 | 33.25052826106890 | 0.8312632065267230 |
| **CPU_2** | | | | 0.8312632065267230 |
| **CPU_3** | T10-LC | 200 | 146.76256628059700 | 0.733812831402984 |
| **CPU_3** | | | | 0.733812831402984 |
| **CPU_4** | T9-LC | 200 | 119.09207913219400 | 0.5954603956609690 |
| **CPU_4** | | | | 0.5954603956609690 |
| **CPU_5** | | | | 0 |
| **CPU_6** | | | | 0 |
| **CPU_7** | | | | 0 |

# حالت دوم:

۱۶ هسته، بهره‌وری ۰.۷۵ و نسبت برابر LC و HC

۳۰٪ هسته‌ها دچار failure می‌شوند. پس برای اطمینان ۰.۹۹۹۹۹۹۹ نیاز است تسک‌های HC هر کدام ۱۴ کپی داشته باشند.

# تسک‌ها:

| Task Name | Period | Criticality | WCET-HI | WCET-LO | Utilization |
|---|---|---|---|---|---|
| T1-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy1-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy2-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy3-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy4-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy5-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy6-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy7-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy8-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy9-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy10-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy11-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy12-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T1-Copy13-HC | 400 | HC | 17.867783128734300 | 6.0407755496960600 | 0.04466945782183570 |
| T2-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy1-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy2-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy3-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy4-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy5-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy6-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy7-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |

| T2-Copy8-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
|---|---|---|---|---|---|
| T2-Copy9-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy10-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy11-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy12-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T2-Copy13-HC | 20 | HC | 0.35443076984212800 | 0.15304198359727100 | 0.0177215384921064 |
| T3-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy1-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy2-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy3-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy4-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy5-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy6-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy7-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy8-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy9-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy10-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy11-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy12-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T3-Copy13-HC | 200 | HC | 1.8425118538675800 | 0.7088432829520980 | 0.009212559269337920 |
| T4-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy1-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy2-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy3-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy4-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy5-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy6-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy7-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy8-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy9-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy10-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T4-Copy11-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |

| T4-Copy12-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
|---|---|---|---|---|---|
| T4-Copy13-HC | 500 | HC | 23.494299457583600 | 11.107337687007200 | 0.04698859891516720 |
| T5-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy1-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy2-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy3-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy4-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy5-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy6-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy7-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy8-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy9-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy10-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy11-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy12-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T5-Copy13-HC | 10 | HC | 0.33645532899031500 | 0.14624801675509100 | 0.033645532899031500 |
| T6-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy1-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy2-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy3-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy4-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy5-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy6-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy7-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy8-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy9-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy10-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy11-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy12-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T6-Copy13-HC | 20 | HC | 0.0028560133788551400 | 0.0008914261352749680 | 0.00014280066894275700 |
| T7-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.013082776832012600 |
| T7-Copy1-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.013082776832012600 |

| | | | | | |
|---|---|---|---|---|---|
| T7-Copy2-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy3-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy4-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy5-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy6-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy7-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy8-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy9-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy10-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy11-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy12-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T7-Copy13-HC | 200 | HC | 2.6165553664025300 | 1.2039255360401300 | 0.0130827768320126000 |
| T8-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy1-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy2-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy3-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy4-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy5-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy6-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy7-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy8-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy9-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy10-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy11-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy12-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T8-Copy13-HC | 20 | HC | 0.5093398786617950 | 0.17813208098802800 | 0.02546699393308980 |
| T9-HC | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.0205694371539443000 |
| T9-Copy1-HC | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.0205694371539443000 |
| T9-Copy2-HC | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.0205694371539443000 |
| T9-Copy3-HC | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.0205694371539443000 |
| T9-Copy4-HC | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.0205694371539443000 |
| T9-Copy5-HC | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.0205694371539443000 |

| | | | | | |
|---|---|---|---|---|---|
| **T9–Copy6–HC** | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.020569437153944300 |
| **T9–Copy7–HC** | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.020569437153944300 |
| **T9–Copy8–HC** | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.020569437153944300 |
| **T9–Copy9–HC** | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.020569437153944300 |
| **T9–Copy10–HC** | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.020569437153944300 |
| **T9–Copy11–HC** | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.020569437153944300 |
| **T9–Copy12–HC** | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.020569437153944300 |
| **T9–Copy13–HC** | 50 | HC | 1.0284718576972200 | 0.41885251842531000 | 0.020569437153944300 |
| **T10–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy1–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy2–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy3–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy4–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy5–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy6–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy7–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy8–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy9–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy10–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy11–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy12–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T10–Copy13–HC** | 40 | HC | 2.5880570845307000 | 0.994787878720582 | 0.06470142711326750 |
| **T11–HC** | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| **T11–Copy1–HC** | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| **T11–Copy2–HC** | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| **T11–Copy3–HC** | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| **T11–Copy4–HC** | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| **T11–Copy5–HC** | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| **T11–Copy6–HC** | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| **T11–Copy7–HC** | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |

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|---|---|---|---|---|---|
| T11-Copy8-HC | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| T11-Copy9-HC | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| T11-Copy10-HC | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| T11-Copy11-HC | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| T11-Copy12-HC | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| T11-Copy13-HC | 100 | HC | 4.390233062596750 | 1.7232789270948600 | 0.043902330625967500 |
| T12-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy1-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy2-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy3-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy4-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy5-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy6-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy7-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy8-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy9-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy10-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy11-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy12-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T12-Copy13-HC | 20 | HC | 0.6279987433775410 | 0.24405673322236700 | 0.03139993716887710 |
| T13-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |
| T13-Copy1-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |
| T13-Copy2-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |
| T13-Copy3-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |
| T13-Copy4-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |
| T13-Copy5-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |
| T13-Copy6-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |
| T13-Copy7-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |
| T13-Copy8-HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.015535368231765700 |

| T13–Copy9–HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.0155353682317657000 |
|---|---|---|---|---|---|
| T13–Copy10–HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.0155353682317657000 |
| T13–Copy11–HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.0155353682317657000 |
| T13–Copy12–HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.0155353682317657000 |
| T13–Copy13–HC | 1000 | HC | 15.535368231765700 | 4.9648200986728500 | 0.0155353682317657000 |
| T14–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy1–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy2–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy3–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy4–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy5–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy6–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy7–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy8–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy9–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy10–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy11–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy12–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T14–Copy13–HC | 1000 | HC | 42.99875439440380 | 20.08925527788100 | 0.04299875439440380 |
| T15–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy1–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy2–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy3–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy4–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy5–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy6–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy7–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy8–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15–Copy9–HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |

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|---|---|---|---|---|
| T15-Copy10-HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15-Copy11-HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15-Copy12-HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T15-Copy13-HC | 20 | HC | 0.8580387834764430 | 0.41638339487354000 | 0.04290193917382220 |
| T16-LC | 50 | LC | 48.712656758218200 | | 0.9742531351643630 |
| T17-LC | 40 | LC | 6.5185483719459800 | | 0.16296370929865000 |
| T18-LC | 400 | LC | 209.09854626283600 | | 0.5227463656570890 |
| T19-LC | 500 | LC | 17.978434701366100 | | 0.03595686940273210 |
| T20-LC | 500 | LC | 29.74353417887430 | | 0.05948706835774860 |
| T21-LC | 50 | LC | 49.73246329555340 | | 0.9946492659110690 |
| T22-LC | 400 | LC | 191.11476914545800 | | 0.4777869228636440 |
| T23-LC | 10 | LC | 1.3567743449438100 | | 0.13567743449438100 |
| T24-LC | 40 | LC | 20.792059130220500 | | 0.5198014782555120 |
| T25-LC | 400 | LC | 236.288424943037 | | 0.5907210623575930 |
| T26-LC | 10 | LC | 0.19580834138296400 | | 0.019580834138296400 |
| T27-LC | 400 | LC | 79.40304035684360 | | 0.19850760089210900 |
| T28-LC | 100 | LC | 30.208833494973900 | | 0.30208833494973900 |
| T29-LC | 500 | LC | 71.57393546523580 | | 0.14314787093047200 |
| T30-LC | 100 | LC | 52.147970961659800 | | 0.521479709616598 |

# نگاشت تسک‌ها با استفاده از WFD:

در صورتی که اولویت با تسک‌های HC باشد، الگوریتم WFD نمی‌تواند نگارش مناسبی برای این تسک‌ها پیدا کند و با ارور زیر مواجه می‌شویم:

Exception: No core found for task T21-LC

اما اگر در اولویت‌بندی تسک‌ها بین LC ها و HC ها تفاوت قائل نشویم نتایج زیر را مشاهده می‌کنیم:

| Core Name | Task Name | Period | WCET | Utilization |
|---|---|---|---|---|
| CPU_0 | T21-LC | 50 | 49.73246329555340 | 0.9946492659110690 |
| CPU_0 | | | | 0.9946492659110690 |
| CPU_1 | T16-LC | 50 | 48.712656758218200 | 0.9742531351643630 |
| CPU_1 | | | | 0.9742531351643630 |
| CPU_2 | T25-LC | 400 | 236.288424943037 | 0.5907210623575930 |
| CPU_2 | T12-Copy13-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_2 | T9-Copy2-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_2 | T9-Copy9-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_2 | T2-Copy8-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_2 | T13-Copy9-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_2 | T7-Copy11-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| CPU_2 | T3-Copy13-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_2 | | | | 0.7188121166595810 |
| CPU_3 | T18-LC | 400 | 209.09854626283600 | 0.5227463656570890 |
| CPU_3 | T5-Copy2-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_3 | T5-Copy12-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_3 | T12-Copy11-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_3 | T8-Copy13-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_3 | T2-Copy1-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_3 | T2-Copy11-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_3 | T13-Copy13-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_3 | T3-Copy1-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |

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|---|---|---|---|---|
| **CPU_3** | T3-Copy4-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| **CPU_3** | | | | 0.7163079263117730 |
| **CPU_4** | T30-LC | 100 | 52.147970961659800 | 0.521479709616598 |
| **CPU_4** | T5-Copy1-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| **CPU_4** | T5-Copy10-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| **CPU_4** | T12-Copy9-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| **CPU_4** | T8-Copy11-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| **CPU_4** | T26-LC | 10 | 0.19580834138296400 | 0.019580834138296400 |
| **CPU_4** | T2-Copy13-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| **CPU_4** | T7-Copy1-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| **CPU_4** | T7-Copy8-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| **CPU_4** | T3-Copy10-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| **CPU_4** | | | | 0.7183181920803940 |
| **CPU_5** | T24-LC | 40 | 20.792059130220500 | 0.5198014782555120 |
| **CPU_5** | T15-Copy13-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| **CPU_5** | T12-Copy1-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| **CPU_5** | T8-Copy1-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| **CPU_5** | T8-Copy10-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| **CPU_5** | T9-Copy13-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| **CPU_5** | T13-Copy1-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| **CPU_5** | T13-Copy10-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| **CPU_5** | T7-Copy12-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| **CPU_5** | T6-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| **CPU_5** | T6-Copy1-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| **CPU_5** | T6-Copy3-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| **CPU_5** | T6-Copy5-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| **CPU_5** | T6-Copy7-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| **CPU_5** | T6-Copy9-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| **CPU_5** | T6-Copy11-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| **CPU_5** | T6-Copy13-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |

| | | | |
|---|---|---|---|
| **CPU_5** | | | | 0.71090269826542100 |
| **CPU_6** | T22-LC | 400 | 191.11476914545800 | 0.4777869228636440 |
| **CPU_6** | T15-Copy4-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| **CPU_6** | T5-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| **CPU_6** | T5-Copy9-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| **CPU_6** | T12-Copy8-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| **CPU_6** | T8-Copy9-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| **CPU_6** | T9-Copy12-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| **CPU_6** | T13-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| **CPU_6** | T13-Copy7-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| **CPU_6** | T7-Copy9-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| **CPU_6** | T3-Copy11-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| **CPU_6** | | | | 0.7187823686563220 |
| **CPU_7** | T28-LC | 100 | 30.208833494973900 | 0.30208833494973900 |
| **CPU_7** | T1-Copy9-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| **CPU_7** | T11-Copy4-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| **CPU_7** | T11-Copy13-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| **CPU_7** | T14-Copy8-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| **CPU_7** | T15-Copy3-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| **CPU_7** | T19-LC | 500 | 17.978434701366100 | 0.03595686940273210 |
| **CPU_7** | T5-Copy13-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| **CPU_7** | T12-Copy12-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| **CPU_7** | T9-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| **CPU_7** | T9-Copy7-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| **CPU_7** | T2-Copy6-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| **CPU_7** | T13-Copy6-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| **CPU_7** | T7-Copy7-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| **CPU_7** | T3-Copy9-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| **CPU_7** | | | | 0.7181566041954880 |
| **CPU_8** | T27-LC | 400 | 79.40304035684360 | 0.19850760089210900 |

| | | | | |
|---|---|---|---|---|
| **CPU_8** | T4-Copy4-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| **CPU_8** | T4-Copy12-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| **CPU_8** | T1-Copy6-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| **CPU_8** | T11-Copy1-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| **CPU_8** | T11-Copy10-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| **CPU_8** | T14-Copy5-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| **CPU_8** | T15-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| **CPU_8** | T15-Copy10-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| **CPU_8** | T5-Copy8-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| **CPU_8** | T12-Copy7-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| **CPU_8** | T8-Copy8-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| **CPU_8** | T9-Copy11-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| **CPU_8** | T2-Copy12-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| **CPU_8** | T7-HC | 200 | 2.61655536664025300 | 0.013082776832012600 |
| **CPU_8** | T7-Copy6-HC | 200 | 2.61655536664025300 | 0.013082776832012600 |
| **CPU_8** | T3-Copy8-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| **CPU_8** | | | | 0.7179431031186740 |
| **CPU_9** | T17-LC | 40 | 6.5185483719459800 | 0.16296370929865000 |
| **CPU_9** | T20-LC | 500 | 29.74353417887430 | 0.05948706835774860 |
| **CPU_9** | T4-Copy7-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| **CPU_9** | T1-Copy1-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| **CPU_9** | T1-Copy10-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| **CPU_9** | T11-Copy5-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| **CPU_9** | T14-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| **CPU_9** | T14-Copy9-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| **CPU_9** | T15-Copy5-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| **CPU_9** | T5-Copy3-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| **CPU_9** | T12-Copy2-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| **CPU_9** | T8-Copy2-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| **CPU_9** | T9-Copy1-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| **CPU_9** | T9-Copy8-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |

| | | | | |
|---|---|---|---|---|
| CPU_9 | T2-Copy7-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_9 | T13-Copy8-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_9 | T7-Copy10-HC | 200 | 2.61655536640253000 | 0.013082776832012600 |
| CPU_9 | T3-Copy12-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_9 | | | | 0.7187836519379440 |
| CPU_10 | T29-LC | 500 | 71.57393546523580 | 0.14314787093047200 |
| CPU_10 | T10-Copy13-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_10 | T4-Copy6-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_10 | T1-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_10 | T1-Copy8-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_10 | T11-Copy3-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_10 | T11-Copy12-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_10 | T14-Copy7-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_10 | T15-Copy2-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_10 | T15-Copy12-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_10 | T12-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_10 | T8-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_10 | T8-Copy7-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_10 | T9-Copy10-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_10 | T2-Copy9-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_10 | T13-Copy11-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_10 | T7-Copy13-HC | 200 | 2.61655536640253000 | 0.013082776832012600 |
| CPU_10 | T6-Copy2-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_10 | T6-Copy4-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_10 | T6-Copy6-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_10 | T6-Copy8-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_10 | T6-Copy10-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_10 | T6-Copy12-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_10 | | | | 0.7108839563551030 |
| CPU_11 | T23-LC | 10 | 1.3567743449438100 | 0.13567743449438100 |

| CPU_11 | T10-Copy12-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
|---|---|---|---|---|
| CPU_11 | T4-Copy5-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_11 | T4-Copy13-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_11 | T1-Copy7-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_11 | T11-Copy2-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_11 | T11-Copy11-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_11 | T14-Copy6-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_11 | T15-Copy1-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_11 | T15-Copy11-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_11 | T5-Copy11-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_11 | T12-Copy10-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_11 | T8-Copy12-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_11 | T2-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_11 | T2-Copy10-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_11 | T13-Copy12-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_11 | T3-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_11 | T3-Copy2-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_11 | | | | 0.7155488390094540 |
| CPU_12 | T10-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_12 | T10-Copy7-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_12 | T10-Copy8-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_12 | T4-Copy3-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_12 | T4-Copy8-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_12 | T1-Copy5-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_12 | T1-Copy11-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_12 | T11-Copy9-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_12 | T14-Copy2-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_12 | T14-Copy13-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_12 | T15-Copy7-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_12 | T5-Copy7-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |

| CPU_12 | T12-Copy4-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
|---|---|---|---|---|
| CPU_12 | T8-Copy6-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_12 | T9-Copy4-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_12 | T2-Copy5-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_12 | T13-Copy3-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_12 | T7-Copy5-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| CPU_12 | T3-Copy5-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_12 | | | | 0.7168563173825710 |
| CPU_13 | T10-Copy1-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_13 | T10-Copy6-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_13 | T10-Copy9-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_13 | T4-Copy2-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_13 | T4-Copy9-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_13 | T1-Copy4-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_13 | T1-Copy12-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_13 | T11-Copy8-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_13 | T14-Copy3-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_13 | T14-Copy12-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_13 | T15-Copy8-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_13 | T5-Copy6-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_13 | T12-Copy5-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_13 | T8-Copy5-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_13 | T9-Copy5-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_13 | T2-Copy4-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_13 | T13-Copy4-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_13 | T7-Copy4-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| CPU_13 | T3-Copy6-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_13 | | | | 0.7168563173825710 |
| CPU_14 | T10-Copy2-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_14 | T10-Copy5-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |

| CPU_14 | T10-Copy10-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
|---|---|---|---|---|
| CPU_14 | T4-Copy1-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_14 | T4-Copy10-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_14 | T1-Copy3-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_14 | T1-Copy13-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_14 | T11-Copy7-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_14 | T14-Copy4-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_14 | T14-Copy11-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_14 | T15-Copy9-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_14 | T5-Copy5-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_14 | T12-Copy6-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_14 | T8-Copy4-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_14 | T9-Copy6-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_14 | T2-Copy3-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_14 | T13-Copy5-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_14 | T7-Copy3-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| CPU_14 | T3-Copy7-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_14 | | | | 0.7168563173825710 |
| CPU_15 | T10-Copy3-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_15 | T10-Copy4-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_15 | T10-Copy11-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_15 | T4-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_15 | T4-Copy11-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_15 | T1-Copy2-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_15 | T11-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_15 | T11-Copy6-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_15 | T14-Copy1-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_15 | T14-Copy10-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_15 | T15-Copy6-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_15 | T5-Copy4-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |

| CPU_15 | T12-Copy3-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
|--------|--------------|------|---------------------|----------------------|
| CPU_15 | T8-Copy3-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_15 | T9-Copy3-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_15 | T2-Copy2-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_15 | T13-Copy2-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_15 | T7-Copy2-HC | 200 | 2.6165553664025300 | 0.013082776832012600 |
| CPU_15 | T3-Copy3-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_15 | | | | 0.7160891901867030 |

# نگاشت تسک‌ها با استفاده از FDD:

| Core Name | Task Name | Period | WCET | Utilization |
|-----------|-----------|--------|------|-------------|
| CPU_0 | T10-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy1-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy2-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy3-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy4-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy5-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy6-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy7-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy8-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy9-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy10-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy11-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy12-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T10-Copy13-HC | 40 | 2.5880570845307000 | 0.06470142711326750 |
| CPU_0 | T4-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_0 | T4-Copy1-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_0 | T6-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_0 | | | | 0.9999399780850230 |
| CPU_1 | T4-Copy2-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy3-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy4-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy5-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy6-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy7-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy8-HC | 500 | 23.494299457583600 | 0.04698859891516720 |

| CPU_1 | T4-Copy9-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
|---|---|---|---|---|
| CPU_1 | T4-Copy10-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy11-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy12-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T4-Copy13-HC | 500 | 23.494299457583600 | 0.04698859891516720 |
| CPU_1 | T1-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T1-Copy1-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T1-Copy2-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T1-Copy3-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T1-Copy4-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T1-Copy5-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T1-Copy6-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T1-Copy7-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T1-Copy8-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_1 | T5-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_1 | T6-Copy1-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_1 | T6-Copy2-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_1 | T6-Copy3-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_1 | | | | 0.9999622422843870 |
| CPU_2 | T1-Copy9-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_2 | T1-Copy10-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_2 | T1-Copy11-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_2 | T1-Copy12-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_2 | T1-Copy13-HC | 400 | 17.867783128734300 | 0.04466945782183570 |
| CPU_2 | T11-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy1-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy2-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy3-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy4-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy5-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy6-HC | 100 | 4.390233062596750 | 0.043902330625967500 |

| CPU_2 | T11-Copy7-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
|---|---|---|---|---|
| CPU_2 | T11-Copy8-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy9-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy10-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy11-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy12-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T11-Copy13-HC | 100 | 4.390233062596750 | 0.043902330625967500 |
| CPU_2 | T14-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_2 | T14-Copy1-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_2 | T14-Copy2-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_2 | T12-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_2 | T6-Copy4-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy5-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy6-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy7-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy8-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy9-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy10-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy11-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy12-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | T6-Copy13-HC | 20 | 0.0028560133788551400 | 0.00014280066894275700 |
| CPU_2 | | | | 0.9998041249142390 |
| CPU_3 | T14-Copy3-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T14-Copy4-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T14-Copy5-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T14-Copy6-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T14-Copy7-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T14-Copy8-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T14-Copy9-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T14-Copy10-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |

| CPU_3 | T14-Copy11-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
|-------|---------------|------|-------------------|---------------------|
| CPU_3 | T14-Copy12-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T14-Copy13-HC | 1000 | 42.99875439440380 | 0.04299875439440380 |
| CPU_3 | T15-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy1-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy2-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy3-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy4-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy5-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy6-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy7-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy8-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy9-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy10-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T15-Copy11-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_3 | T3-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_3 | | | | 0.9970221276936460 |
| CPU_4 | T15-Copy12-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_4 | T15-Copy13-HC | 20 | 0.8580387834764430 | 0.04290193917382220 |
| CPU_4 | T5-Copy1-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy2-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy3-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy4-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy5-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy6-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy7-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy8-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy9-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy10-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |

| CPU_4 | T5-Copy11-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
|---|---|---|---|---|
| CPU_4 | T5-Copy12-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T5-Copy13-HC | 10 | 0.33645532899031500 | 0.033645532899031500 |
| CPU_4 | T12-Copy1-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy2-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy3-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy4-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy5-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy6-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy7-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy8-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy9-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy10-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy11-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy12-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T12-Copy13-HC | 20 | 0.6279987433775410 | 0.03139993716887710 |
| CPU_4 | T8-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_4 | T8-Copy1-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_4 | T13-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_4 | | | | 0.9978643453284 |
| CPU_5 | T8-Copy2-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy3-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy4-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy5-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy6-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy7-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy8-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy9-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy10-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |
| CPU_5 | T8-Copy11-HC | 20 | 0.5093398786617950 | 0.02546699393308980 |

| CPU_5 | T8-Copy12-HC | 20 | 0.50933987866179500 | 0.02546699393308980 |
|---|---|---|---|---|
| CPU_5 | T8-Copy13-HC | 20 | 0.50933987866179500 | 0.02546699393308980 |
| CPU_5 | T9-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy1-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy2-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy3-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy4-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy5-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy6-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy7-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy8-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy9-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy10-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy11-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy12-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T9-Copy13-HC | 50 | 1.0284718576972200 | 0.020569437153944300 |
| CPU_5 | T2-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy1-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy2-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy3-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy4-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy5-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy6-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy7-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy8-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy9-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy10-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy11-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy12-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T2-Copy13-HC | 20 | 0.35443076984212800 | 0.0177215384921064 |
| CPU_5 | T13-Copy1-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |
| CPU_5 | T13-Copy2-HC | 1000 | 15.535368231765700 | 0.015535368231765700 |

| CPU_5 | T13-Copy3-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
|---|---|---|---|---|
| CPU_5 | T13-Copy4-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_5 | T13-Copy5-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_5 | T13-Copy6-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_5 | T13-Copy7-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_5 | T13-Copy8-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_5 | T13-Copy9-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_5 | T13-Copy10-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_5 | | | | 0.9970312685594450 |
| CPU_6 | T13-Copy11-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_6 | T13-Copy12-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_6 | T13-Copy13-HC | 1000 | 15.535368231765700 | 0.0155353682317657000 |
| CPU_6 | T7-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy1-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy2-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy3-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy4-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy5-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy6-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy7-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy8-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy9-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy10-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy11-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy12-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T7-Copy13-HC | 200 | 2.6165553664025300 | 0.0130827768320126000 |
| CPU_6 | T3-Copy1-HC | 200 | 1.8425118538675800 | 0.0092125592693379200 |
| CPU_6 | T3-Copy2-HC | 200 | 1.8425118538675800 | 0.0092125592693379200 |
| CPU_6 | T3-Copy3-HC | 200 | 1.8425118538675800 | 0.0092125592693379200 |
| CPU_6 | T3-Copy4-HC | 200 | 1.8425118538675800 | 0.0092125592693379200 |

| CPU_6 | T3-Copy5-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
|-------|-------------|-----|--------------------|-----------------------|
| CPU_6 | T3-Copy6-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_6 | T3-Copy7-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_6 | T3-Copy8-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_6 | T3-Copy9-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_6 | T3-Copy10-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_6 | T3-Copy11-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_6 | T3-Copy12-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_6 | T3-Copy13-HC | 200 | 1.8425118538675800 | 0.009212559269337920 |
| CPU_6 | T25-LC | 400 | 236.288424943037 | 0.5907210623575930 |
| CPU_6 | T20-LC | 500 | 29.74353417887430 | 0.05948706835774860 |
| CPU_6 | | | | 0.9997363815602080 |
| CPU_7 | T21-LC | 50 | 49.73246329555340 | 0.9946492659110690 |
| CPU_7 | | | | 0.9946492659110690 |
| CPU_8 | T16-LC | 50 | 48.712656758218200 | 0.9742531351643630 |
| CPU_8 | T26-LC | 10 | 0.19580834138296400 | 0.019580834138296400 |
| CPU_8 | | | | 0.9938339693026600 |
| CPU_9 | T18-LC | 400 | 209.09854626283600 | 0.5227463656570890 |
| CPU_9 | T28-LC | 100 | 30.208833494973900 | 0.30208833494973900 |
| CPU_9 | T17-LC | 40 | 6.5185483719459800 | 0.16296370929865000 |
| CPU_9 | | | | 0.9877984099054780 |
| CPU_10 | T30-LC | 100 | 52.147970961659800 | 0.521479709616598 |
| CPU_10 | T22-LC | 400 | 191.11476914545800 | 0.4777869228636440 |
| CPU_10 | | | | 0.9992666324802420 |
| CPU_11 | T24-LC | 40 | 20.792059130220500 | 0.5198014782555120 |
| CPU_11 | T27-LC | 400 | 79.40304035684360 | 0.19850760089210900 |
| CPU_11 | T29-LC | 500 | 71.57393546523580 | 0.14314787093047200 |
| CPU_11 | T23-LC | 10 | 1.3567743449438100 | 0.13567743449438100 |
| CPU_11 | | | | 0.9971343845724730 |
| CPU_12 | T19-LC | 500 | 17.978434701366100 | 0.03595686940273210 |

| | | | | |
|---|---|---|---|---|
| **CPU_12** | | | | 0.03595686940273210 |
| **CPU_13** | | | | 0 |
| **CPU_14** | | | | 0 |
| **CPU_15** | | | | 0 |

# حالت سوم:

۱۶ هسته، بهره‌وری ۰.۷۵ و نسبت برابر LC و HC

۵۰ درصد هسته‌ها دچار overrun می‌شوند. (روی نگاشت تاثیر خاصی ندارد.)

## تسک‌ها:

| Task Name | Period | Criticality | WCET-HI | WCET-LO | Utilization |
|-----------|--------|-------------|---------|---------|-------------|
| T1-HC | 400 | HC | 250.14896380228000 | 84.5708576957448 | 0.6253724095056990 |
| T2-HC | 20 | HC | 4.962030777789790 | 2.1425877703618000 | 0.2481015388894900 |
| T3-HC | 200 | HC | 25.79516595414620 | 9.923805961329370 | 0.12897582977073100 |
| T4-HC | 500 | HC | 328.9201924061700 | 155.50272761810100 | 0.65784038848123400 |
| T5-HC | 10 | HC | 4.710374605864410 | 2.047472234571270 | 0.4710374605864410 |
| T6-HC | 20 | HC | 0.03998418730397190 | 0.012479965893849600 | 0.0019992093651986000 |
| T7-HC | 200 | HC | 36.63177512963540 | 16.85495750456180 | 0.1831588756481770 |
| T8-HC | 20 | HC | 7.130758301265130 | 2.493849133832390 | 0.3565379150632570 |
| T9-HC | 50 | HC | 14.398606007761000 | 5.86393525795434 | 0.2879721201552210 |
| T10-HC | 40 | HC | 36.232799183429800 | 13.927030302088100 | 0.9058199795857450 |
| T11-HC | 100 | HC | 61.46326287635450 | 24.125904979328100 | 0.6146326287635450 |
| T12-HC | 20 | HC | 8.791982407285580 | 3.4167942651131400 | 0.43959912036427900 |
| T13-HC | 1000 | HC | 217.49515524472000 | 69.50748138142000 | 0.21749515524472000 |
| T14-HC | 1000 | HC | 601.9825615216540 | 281.24957389033400 | 0.60198256152165400 |
| T15-HC | 20 | HC | 12.012542968670200 | 5.829367528229560 | 0.6006271484335100 |
| T16-LC | 50 | LC | 48.712656758218200 | | 0.9742531351643630 |
| T17-LC | 40 | LC | 6.5185483719459800 | | 0.16296370929865000 |
| T18-LC | 400 | LC | 209.09854626283600 | | 0.5227463656570890 |
| T19-LC | 500 | LC | 17.978434701366100 | | 0.03595686940273210 |
| T20-LC | 500 | LC | 29.74353417887430 | | 0.05948706835774860 |

| | | | | |
|---|---|---|---|---|
| **T21-LC** | 50 | LC | 49.73246329555340 | 0.9946492659110690 |
| **T22-LC** | 400 | LC | 191.11476914545800 | 0.4777869228636440 |
| **T23-LC** | 10 | LC | 1.3567743449438100 | 0.13567743449438100 |
| **T24-LC** | 40 | LC | 20.792059130220500 | 0.5198014782555120 |
| **T25-LC** | 400 | LC | 236.288424943037 | 0.5907210623575930 |
| **T26-LC** | 10 | LC | 0.19580834138296400 | 0.019580834138296400 |
| **T27-LC** | 400 | LC | 79.40304035684360 | 0.19850760089210900 |
| **T28-LC** | 100 | LC | 30.208833494973900 | 0.30208833494973900 |
| **T29-LC** | 500 | LC | 71.57393546523580 | 0.14314787093047200 |
| **T30-LC** | 100 | LC | 52.147970961659800 | 0.521479709616598 |

## نگاشت تسک‌ها با استفاده از WFD:

| Core Name | Task Name | Period | WCET | Utilization |
|---|---|---|---|---|
| CPU_0 | T10-HC | 40 | 36.232799183429800 | 0.9058199795857450 |
| CPU_0 | | | | 0.9058199795857450 |
| CPU_1 | T4-HC | 500 | 328.9201924061700 | 0.6578403848123400 |
| CPU_1 | | | | 0.6578403848123400 |
| CPU_2 | T1-HC | 400 | 250.14896380228000 | 0.6253724095056990 |
| CPU_2 | T19-LC | 500 | 17.978434701366100 | 0.03595686940273210 |
| CPU_2 | | | | 0.6613292789084310 |
| CPU_3 | T11-HC | 100 | 61.46326287635450 | 0.6146326287635450 |
| CPU_3 | T20-LC | 500 | 29.74353417887430 | 0.05948706835774860 |
| CPU_3 | | | | 0.6741196971212930 |
| CPU_4 | T14-HC | 1000 | 601.9825615216540 | 0.6019825615216540 |
| CPU_4 | T23-LC | 10 | 1.3567743449438100 | 0.13567743449438100 |
| CPU_4 | | | | 0.7376599960160340 |
| CPU_5 | T15-HC | 20 | 12.012542968670200 | 0.6006271484335100 |
| CPU_5 | T29-LC | 500 | 71.57393546523580 | 0.14314787093047200 |
| CPU_5 | | | | 0.7437750193639820 |
| CPU_6 | T5-HC | 10 | 4.710374605864410 | 0.4710374605864410 |
| CPU_6 | T17-LC | 40 | 6.5185483719459800 | 0.16296370929865000 |
| CPU_6 | T26-LC | 10 | 0.19580834138296400 | 0.019580834138296400 |
| CPU_6 | | | | 0.6535820040233870 |
| CPU_7 | T12-HC | 20 | 8.791982407285580 | 0.43959912036427900 |
| CPU_7 | T27-LC | 400 | 79.40304035684360 | 0.19850760089210900 |
| CPU_7 | | | | 0.6381067212563880 |
| CPU_8 | T8-HC | 20 | 7.130758301265130 | 0.3665379150632570 |
| CPU_8 | T28-LC | 100 | 30.208833494973900 | 0.30208833494973900 |

| | | | | |
|---|---|---|---|---|
| **CPU_8** | | | | 0.6586262500129960 |
| **CPU_9** | T9-HC | 50 | 14.398606007761000 | 0.2879721201552210 |
| **CPU_9** | T22-LC | 400 | 191.11476914545800 | 0.4777869228636440 |
| **CPU_9** | | | | 0.765759043018865 |
| **CPU_10** | T2-HC | 20 | 4.962030777789790 | 0.2481015388894900 |
| **CPU_10** | T24-LC | 40 | 20.792059130220500 | 0.5198014782555120 |
| **CPU_10** | | | | 0.7679030171450010 |
| **CPU_11** | T13-HC | 1000 | 217.49515524472000 | 0.21749515524472000 |
| **CPU_11** | T30-LC | 100 | 52.147970961659800 | 0.521479709616598 |
| **CPU_11** | | | | 0.7389748648613180 |
| **CPU_12** | T7-HC | 200 | 36.63177512963540 | 0.1831588756481770 |
| **CPU_12** | T18-LC | 400 | 209.09854626283600 | 0.5227463656570890 |
| **CPU_12** | | | | 0.705905241305266 |
| **CPU_13** | T3-HC | 200 | 25.79516595414620 | 0.12897582977073100 |
| **CPU_13** | T25-LC | 400 | 236.288424943037 | 0.5907210623575930 |
| **CPU_13** | | | | 0.7196968921283230 |
| **CPU_14** | T6-HC | 20 | 0.03998418730397190 | 0.0019992093651986000 |
| **CPU_14** | T16-LC | 50 | 48.712656758218200 | 0.9742531351643630 |
| **CPU_14** | | | | 0.9762523445295620 |
| **CPU_15** | T21-LC | 50 | 49.73246329555340 | 0.9946492659110690 |
| **CPU_15** | | | | 0.9946492659110690 |

# نگاشت تسک‌ها با استفاده از FDD:

| Core Name | Task Name | Period | WCET | Utilization |
|-----------|-----------|--------|------|-------------|
| CPU_0 | T10-HC | 40 | 36.232799183429800 | 0.9058199795857450 |
| CPU_0 | T6-HC | 20 | 0.03998418730397190 | 0.0019992093651986000 |
| CPU_0 | T20-LC | 500 | 29.74353417887430 | 0.05948706835774860 |
| CPU_0 | T26-LC | 10 | 0.19580834138296400 | 0.019580834138296400 |
| CPU_0 | | | | 0.9868870914469890 |
| CPU_1 | T4-HC | 500 | 328.9201924061700 | 0.6578403848123400 |
| CPU_1 | T9-HC | 50 | 14.398606007761000 | 0.2879721201552210 |
| CPU_1 | T19-LC | 500 | 17.978434701366100 | 0.03595686940273210 |
| CPU_1 | | | | 0.9817693743702930 |
| CPU_2 | T1-HC | 400 | 250.14896380228000 | 0.6253724095056990 |
| CPU_2 | T8-HC | 20 | 7.130758301265130 | 0.3565379150632570 |
| CPU_2 | | | | 0.9819103245689560 |
| CPU_3 | T11-HC | 100 | 61.46326287635450 | 0.6146326287635450 |
| CPU_3 | T2-HC | 20 | 4.962030777789790 | 0.2481015388894900 |
| CPU_3 | T3-HC | 200 | 25.79516595414620 | 0.12897582977073100 |
| CPU_3 | | | | 0.9917099974237650 |
| CPU_4 | T14-HC | 1000 | 601.9825615216540 | 0.6019825615216540 |
| CPU_4 | T13-HC | 1000 | 217.49515524472000 | 0.21749515524472000 |
| CPU_4 | T17-LC | 40 | 6.5185483719459800 | 0.16296370929865000 |
| CPU_4 | | | | 0.9824414260650230 |
| CPU_5 | T15-HC | 20 | 12.012542968670200 | 0.6006271484335100 |
| CPU_5 | T7-HC | 200 | 36.63177512963540 | 0.1831588756481770 |
| CPU_5 | T27-LC | 400 | 79.40304035684360 | 0.19850760089210900 |
| CPU_5 | | | | 0.9822936249737960 |
| CPU_6 | T5-HC | 10 | 4.710374605864410 | 0.4710374605864410 |
| CPU_6 | T12-HC | 20 | 8.791982407285580 | 0.43959912036427900 |

| | | | | |
|---|---|---|---|---|
| **CPU_6** | | | | 0.9106365809507200 |
| **CPU_7** | T21-LC | 50 | 49.73246329555340 | 0.9946492659110690 |
| **CPU_7** | | | | 0.9946492659110690 |
| **CPU_8** | T16-LC | 50 | 48.712656758218200 | 0.9742531351643630 |
| **CPU_8** | | | | 0.9742531351643630 |
| **CPU_9** | T25-LC | 400 | 236.288424943037 | 0.5907210623575930 |
| **CPU_9** | T28-LC | 100 | 30.208833494973900 | 0.30208833494973900 |
| **CPU_9** | | | | 0.8928093973073310 |
| **CPU_10** | T18-LC | 400 | 209.09854626283600 | 0.5227463656570890 |
| **CPU_10** | T29-LC | 500 | 71.57393546523580 | 0.14314787093047200 |
| **CPU_10** | T23-LC | 10 | 1.3567743449438100 | 0.13567743449438100 |
| **CPU_10** | | | | 0.8015716710819420 |
| **CPU_11** | T30-LC | 100 | 52.147970961659800 | 0.521479709616598 |
| **CPU_11** | T22-LC | 400 | 191.11476914545800 | 0.4777869228636440 |
| **CPU_11** | | | | 0.9992666324802420 |
| **CPU_12** | T24-LC | 40 | 20.792059130220500 | 0.5198014782555120 |
| **CPU_12** | | | | 0.5198014782555120 |
| **CPU_13** | | | | 0 |
| **CPU_14** | | | | 0 |
| **CPU_15** | | | | 0 |